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METHODS FOR IMPROVEMENT OF TRICKLING
FILTER PLANT PERFORMANCE. PART I.
MECHANICAL AND BIOLOGICAL OPTIMA

James C. Brown, et al

North Carolina University

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METHODS FOR IMPROVEMENT OF
TRICKLING FILTER PLANT PERFORMANCE

PART I

MECHANICAL AND BIOLOGICAL OPTIMA

by

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This report has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

ABSTRACT

The Chapel Hill high rate trickling filter plant which consists of two parallel and equal lines of treatment units was operated in parallel as two separate plants over a period of 26 months. Each side was operated with various fractions of influent flow and recirculation flow rates. Statistical analysis of operating results indicated that the common mathematical models are not reliable in predicting daily performance at the Chapel Hill plant. They are, however, useful in predicting long term average performance. Recirculation ratios as high as 3.0 proved beneficial at total hydraulic loadings of less than 20 mgad. Operation above this loading is not currently feasible at Chapel Hill.

The hydraulic surface loading of the final settling tanks was found to have a significant effect on overall plant performance. A surface loading of 500 gpd/ft² is recommended for the design of final tanks in new plants.

Pilot plant studies using 4-foot diameter rock filters indicate a significant advantage for two-stage filtration even though the hydraulic loading on each stage may be double that for single-stage operation.

Pilot plant studies of activated sludge treatment of trickling filter effluent were conducted. The process proved effective in improving removal of BOD, if effective final solids removal facilities are provided. The process also proved effective in reducing nitrogenous oxygen demand.

This report was submitted in fulfillment of Project Number 11010 DGA, Contract Number 14-12-505 between the University of North Carolina and the U. S. Environmental Protection Agency.

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SECTION I

CONCLUSIONS

A. TRICKLING FILTER STUDIES

To improve the performance of existing trickling filter plants with a minimum of modification the following procedures are recommended:

1. If two filters are available, and two-stage or parallel operation of the filters is possible, the two-stage method should be used as it will provide significantly better performance.
2. Filter recirculation ratios of up to 3.0 will significantly improve the performance of most high rate filters. If pumping capacity permits this level of recirculation, it should be used.
3. If filter recirculation is drawn from a point downstream of the final settling tanks the entire plant flow plus recirculation flow must pass through the tank. The final settling tank will be much more effective as a solids separation unit if recirculation is withdrawn before the final tank. Therefore, overall plant performance will be improved.
4. The quality of anaerobic digester supernatant and its method of return to the plant flow units can have a significant effect on plant performance. The intermittent, high rate, return of supernatant from a mixed digester will have a deleterious effect. The continuous return of supernatant from an unmixed secondary digester during periods of low plant flow, e.g., during the night, will have little effect on plant performance. Therefore, when two or more digesters are available, one unit should be operated as a secondary to provide conditions for the thickening of sludge and the separation of supernatant.

The performance of some trickling filter plants can be improved with minor additions or revisions, e.g.:

1. Additional recirculation pumping capacity may be provided by installing larger pump impellers with higher horsepower motors. Plant performance will be improved.
2. If two filters exist at a plant but no provision has been made for two-stage filtration, the necessary facilities, i.e., pumps, control boxes, and flow control systems, can be added to permit two-stage operation. Two-stage filtration will improve performance.

When new trickling filter plants are being designed or major additions are to be made to existing facilities, the following factors should be carefully considered:

1. Trickling filter plant performance is not significantly affected by the point of recirculation return, i.e., ahead of the primary settling tank or directly to the filter. For this reason direct recirculation is recommended, as a smaller primary tank will be required to meet design standards. The money saved in this manner should be invested in larger final settling tanks.
2. Final settling tank design should be based on a surface loading of 500 gpd/ft². At this loading the performance of the tank will be enhanced during both single- and two-stage operation of filters. Furthermore, the settling tank will be suitable for the separation of chemical floc if phosphorus removal or enhanced overall performance is required at some future date. In this regard, structures to facilitate the future addition of chemicals should be incorporated into initial plant construction. This would include provision for the addition of rapid mixing, flocculation, and space for chemical storage and feeding equipment.
3. At least two trickling filters should be provided along with facilities and controls to permit two-stage operation and interchange of the lead and secondary filters. When the proposed facility is so small that two filters are not economical, another treatment method should be considered.
4. Existing mathematical models and models developed during this investigation are not reliable predictors of the daily performance of the Chapel Hill high rate trickling filter plant. The models developed during this study are, however, suitable for the prediction of average performance over a period of several weeks.

B. ACTIVATED SLUDGE PILOT PLANTS

1. An activated sludge process is readily maintained with trickling filter effluent as feed. The process significantly, but not spectacularly, improves overall removals of BOD, total organic carbon, and suspended solids. Short (< 1 hr) aeration periods suffice to increase overall BOD removals by 3-5%. BOD removals generally increase with detention time.
2. Consistent performance of the tertiary activated sludge process depends to a large extent on effective solids removal. With effective solids removal substantial BOD removals can be achieved even at 0.4 hr detention. With effective removal of suspended solids, overall BOD removals greater than 90% can be achieved.

3. Extensive nitrification can be achieved in the tertiary activated sludge process. Significant reductions of organic and ammonia nitrogen concentrations indicate that substantial reduction of the nitrogenous oxygen demand (NOD) can be accomplished. The amount of NOD reduction is largely a function of aeration time and BOD loading. In the relatively soft Chapel Hill water addition of bicarbonate alkalinity enhanced nitrification.

NOD removals of greater than 80% were achieved under conditions of low influent BOD concentration (35 mg/l), bicarbonate addition, and 1-9 hr detention time. With an average influent BOD of 72, more than 4 hr were required.

With low influent BOD levels, even at short aeration times (< 1 hr) NOD reductions of greater than 50% were observed.

Extensive nitrification (> 90%, based on removal of influent ammonia) frequently occurred when the pH in the aerator averaged less than 7.0, leading to the conclusion that the optimum pH range for nitrification is not as narrow as indicated by previous investigators.

Based on these studies, if NOD reduction is required in upgrading an existing trickling filter plant, terminal activated sludge treatment may provide an acceptable solution. If NOD reduction is required in a new plant, trickling filter treatment followed by activated sludge treatment may allow the activated sludge system to operate more successfully due to the dampening effect of the filter on changes in influent quality.

SECTION II

RECOMMENDATIONS

A. TRICKLING FILTERS

1. New trickling filter treatment facilities should be designed for two-stage operation with provision for interchange of the lead filter.
2. The effectiveness of intermediate settling between filter stages should be determined.
3. Studies of deep filters designed to operate at high hydraulic loadings, with continuous rather than intermittent liquid application, would help in the verification or modification of rational filter performance models as developed by Howland, Schulze, and Eckenfelder. With the proper experimental operation of such filters the effect of both liquid detention and liquid turbulence might be determined. The systematic development of deep filters or multi-stage filtration processes designed to operate at high hydraulic loadings could result in significant economies while the traditional advantages of the trickling filter process, i.e., simplicity of operation and resistance to upset, could be retained.
4. Final settling tanks in new trickling filter plants should be designed at an average surface loading of 500 gallons/day/ft². Designers should provide for the future addition of chemical treatment, i.e., provision should be made for the installation of mixing and flocculation equipment prior to final settling.

B. ACTIVATED SLUDGE PILOT PLANTS

1. The effect of pH, alkalinity, and organic loading on nitrification systems should be examined further. Whereas such factors have been extensively investigated in laboratory studies with defined media, further information is needed on their effect on actual treatment systems. In addition, development of a good method for determining the relative numbers of nitrifiers in a given sample of sludge would be useful in formulating a valid description of the relationship of mixed liquor suspended solids concentration to nitrifying activity.
2. The effectiveness of the trickling filter - tertiary activated sludge process should be verified at full-scale. In particular, the following parameters need assessment: temperature variations, sludge production, control of effluent solids.

SECTION III

INTRODUCTION

A great many secondary municipal wastewater treatment plants in the United States use trickling filters as the biological units. Most of these are "high-rate" installations, characterized by relatively heavy rates of wastewater application with recirculation of treated effluent to dilute influent before application to the filter. Typically, trickling filter plants attain 70-85% BOD removal through the entire facility, including removal of about one-third of the influent BOD by primary sedimentation.

Modern technology of wastewater treatment and pressures for higher removals of BOD, suspended solids, and other constituents have resulted in trends toward installation of activated sludge instead of trickling filters in new plants. Nevertheless, thousands of communities in the U.S.A. still have trickling filter installations. Most perform at a level which is, or soon will be, inadequate for meeting regulatory requirements, leaving those municipalities in the situation of having to enhance plant efficiency. That could be accomplished through merely enlarging existing facilities, adding other types of treatment processes, or replacing their trickling filters with other types of units.

Information currently available to design engineers and operating personnel is inadequate to permit accurate selection of optimum systems for enhancing performance of trickling filter plants to levels that might be required. The overall objective of this project was to develop information which could help design engineers and operating personnel select among practical alternatives available for improving performance of trickling filter plants.

The general approach was based on experimental investigations at laboratory, pilot- and full-scale. They were conducted at the Mason Farm Sewage Treatment Plant in Chapel Hill, North Carolina, operated for the Town by personnel in the Department of Environmental Sciences and Engineering at the University of North Carolina. The most recent plant enlargement (1968) included modifications to provide unusual flexibility in full-scale operation, as well as facilities for laboratory and pilot studies. Among other unusual features, the new units were designed to permit operating the plant as two separate identical trickling filter installations, between which the influent flow could be divided in any desired proportion with capability for independent control of recirculation and other aspects of operation in each.

The experimental program was designed to develop practical information which would be valuable to engineers engaged in modifying trickling filter plants to improve performance and to evaluate techniques which

could be applied by plant operators to assure optimum performance of existing and proposed units. Activities were directed principally towards evaluating the effects of various parameters on treatment efficiency and investigating the performance of an activated sludge system based on installation of an aeration tank between the trickling filter and final settling tank. Each investigation involved use of several experimental facilities to study various aspects of operation, as will be discussed in detail in appropriate sections of the report.

SECTION IV

CHAPEL HILL PLANT AND WASTEWATER RESEARCH CENTER

A. Plant Design

The Wastewater Treatment Plant for Chapel Hill is a conventional high-rate trickling filter installation treating predominantly domestic sewage. There is substantially no industrial or other unusual contribution, except for hospital and laboratories of the University of North Carolina. Table 4-1 summarizes some of the more pertinent characteristics of the influent for the period of this study, 9/69-1/72. Figure 4-1 is a partial flow sheet for the Plant and Table 4-2 summarizes characteristics and design parameters of major units.

Incoming wastewater passes through a mechanically cleaned bar screen, with a manual unit serving as a backup in case of failure. Subsequently, the flow is metered and grit removed in a detritor. Design of the grit removal effluent structure allows splitting of flow into any desired proportions for diversion to the two identical treatment plant batteries.

Based on total plant influent of 3.0 mgd, equally divided between the two batteries, and recycle ratio of 2:1 the 70-foot primary clarifiers provide 1.8 hours detention and overflow rate of 1180 gals/ft²/day. Each trickling filter is 120-feet in diameter with a stone depth of 4.25 feet, providing a "design" loading of about 35 lbs. BOD/day/1000 cf (assuming one-third removal in the primary) at hydraulic loading approximating 17 mgd/acre. Trickling filter effluent passes through a wet well from which any or all of three pumps take recycle at rates up to 7.5 mgd in each battery. Net plant flow (no recycle) passes to 45-foot final clarifiers, providing 1.9 hours detention at 1.5 mgd and 960 gals/ft²/day at 1.5 mgd through each battery.

B. Plant Operation

Normal plant operation is based on recycle to the primary clarifier influent, but a connection has been provided to permit recycling directly around each trickling filter, without settling. Series or stage operation of the filters is not possible. Typically, the plant operates with the batteries in parallel, as shown in Figure 4-1, in effect providing two separate treatment facilities. The influent sewage can be divided between these as desired for operation at different loadings and recycle in each adjusted independently.

Sludge from each final settling tank is pumped to influent of the primary clarifier, in which it settles again in combination with primary sludge. Sludge and scum are pumped from primary clarifiers to a 75-

TABLE 4-1
CHARACTERISTICS OF PLANT INFLUENT*
September, 1969 - February, 1972
(Monthly Averages)

	BOD ₅ mg/l	SS mg/l	TOC mg/l	Kjeld -N mg/l	NH ₃ -N mg/l	NO ₃ -N mg/l	TP mg/l	TIP mg/l	MBAS mg/l	pH	Alk. mg/l as CaCO ₃
9/69	167	238	140	42.3	29.1	0.10	14.0	10.1	3.85		
10/69	176	262	125	38.1	27.0	0.08	8.8	7.4	3.57		
11/69	153	186	113	43.4	28.4	0.05	-----	-----	3.34		
12/69	170	159	107	43.8	27.3	0.05	-----	-----	3.43		
1/70	193	170	139	29.8	19.5	0.30	-----	9.3	2.91		
2/70	182	185	124	36.6	20.0	0.30	-----	8.3	2.39		
3/70	159	162	116	37.7	21.9	0.28	-----	8.5	2.75		
4/70	165	150	109	37.2	23.7	0.30	-----	8.2	2.76		
5/70	142	189	100	33.5	23.0	0.26	10.8	7.9	2.67		
6/70	117	169	117	33.6	21.7	0.19	11.5	8.8	3.04		
7/70	126	146	116	36.6	22.2	0.23	10.6	8.6	3.06		
8/70	176	187	112	32.2	22.2	0.16	10.3	7.9	2.57		
9/70	141	159	114	26.3	22.3	0.12	11.2	9.2	2.60		
10/70	136	198	110	37.1	26.3	0.14	11.1	8.5	3.10		
11/70	143	195	116	35.5	22.8	0.20	10.9	6.5			
12/70	150	175	130	35.8	23.2	0.14	11.6	7.5		7.3	
1/71	128	156	111	28.8	22.0	0.18	11.5	6.4		7.4	141
2/71	134	156	120	28.2	20.6	0.10	8.8	6.0		7.0	133
3/71	134	163	111	28.8	20.2	0.10	8.6	5.8		7.1	131
4/71	136	189	123	31.2	26.5	0.10	9.0	6.8		7.2	152
5/71	159	172	148	30.0	25.5	0.20	9.7	5.8		7.2	150
6/71	156	195	132								
7/71	136	168	121	30.2	20.5	0.17	10.8	8.1			
8/71	134	146	130	25.6	19.2	0.20	9.7	7.0			
9/71	188	136	142	28.1	24.7	0.50	9.4	6.7			
10/71	140	120	114								
11/71	170	167	154								
12/71	183	187	148								
1/72	170	186	146	30.6	20.3	0.26	10.9	7.4		7.0	
2/72	161	162	138	28.5	21.7	0.13	9.1	7.0		7.0	
Ave	154	174	124	31.2	23.1	0.19	10.4	7.7	3.00	7.2	141
Max	193	262	154	43.8	29.1	0.50	14.0	10.1	3.85	7.4	152
Min	126	120	100	25.6	19.2	0.05	8.8	5.8	2.39	7.0	131
Cases	30	30	30	26	26	26	20	24	14	8	5

*Based on analytical methods described in Table 4-3

TABLE 4-2

CHARACTERISTICS AND DESIGN PARAMETERS OF UNITS
IN CHAPEL HILL TREATMENT PLANT

CURRENT AVERAGE FLOW Approximately 3.0 mgd

SCREENS:

- a) One automatic, mechanically-cleaned
- b) One manually-cleaned (Standby)

GRIT REMOVAL

One mechanically-cleaned detritor

PRIMARY SETTLING (Two units)

- a) Diameter = 70 feet
- b) Water depth = 12 feet
- c) Detention = 1.8 hours (2:1 Recycle)
- d) Overflow rate = 1180 gals/ft²/day (@ 2:1 Recycle)
- e) Mechanical sludge and scum removal

TRICKLING FILTERS (Two units)

- a) Diameter = 120 feet
- b) Stone depth = 4.25 feet
- c) Rotary distributors
- d) BOD₅ loading about 35 lbs/day/1000 c.f. (Assuming 1/3 removal in primary)
- e) Hydraulic loading = 17 mgd/acre (2:1 Recycle)

FINAL SETTLING (Two units)

- a) Diameter = 45 feet
- b) Water depth = 10 feet
- c) Detention = 1.9 hours
- d) Overflow rate = 960 gals/ft²/day
- e) Mechanical sludge removal

RECIRCULATION PUMPS

In each battery, one 1.5 mgd and two 3.0 mgd units.

DIGESTERS

- a) One 75' diameter, mechanically mixed, heated, floating cover
- b) One 50' diameter, mechanically mixed, heated, floating cover
- c) One 50' diameter, no mixing, floating cover (not now in operation)
- d) Heat exchanger (Digester gas or propane) for units in operation now, including pumps, control valves, interconnecting piping

TABLE 4-2 (continued)

SLUDGE DEWATERING

- a) 18 drying beds, 25' x 50', uncovered
- b) One 18" bowl, 15-17 gpm, Bird centrifuge

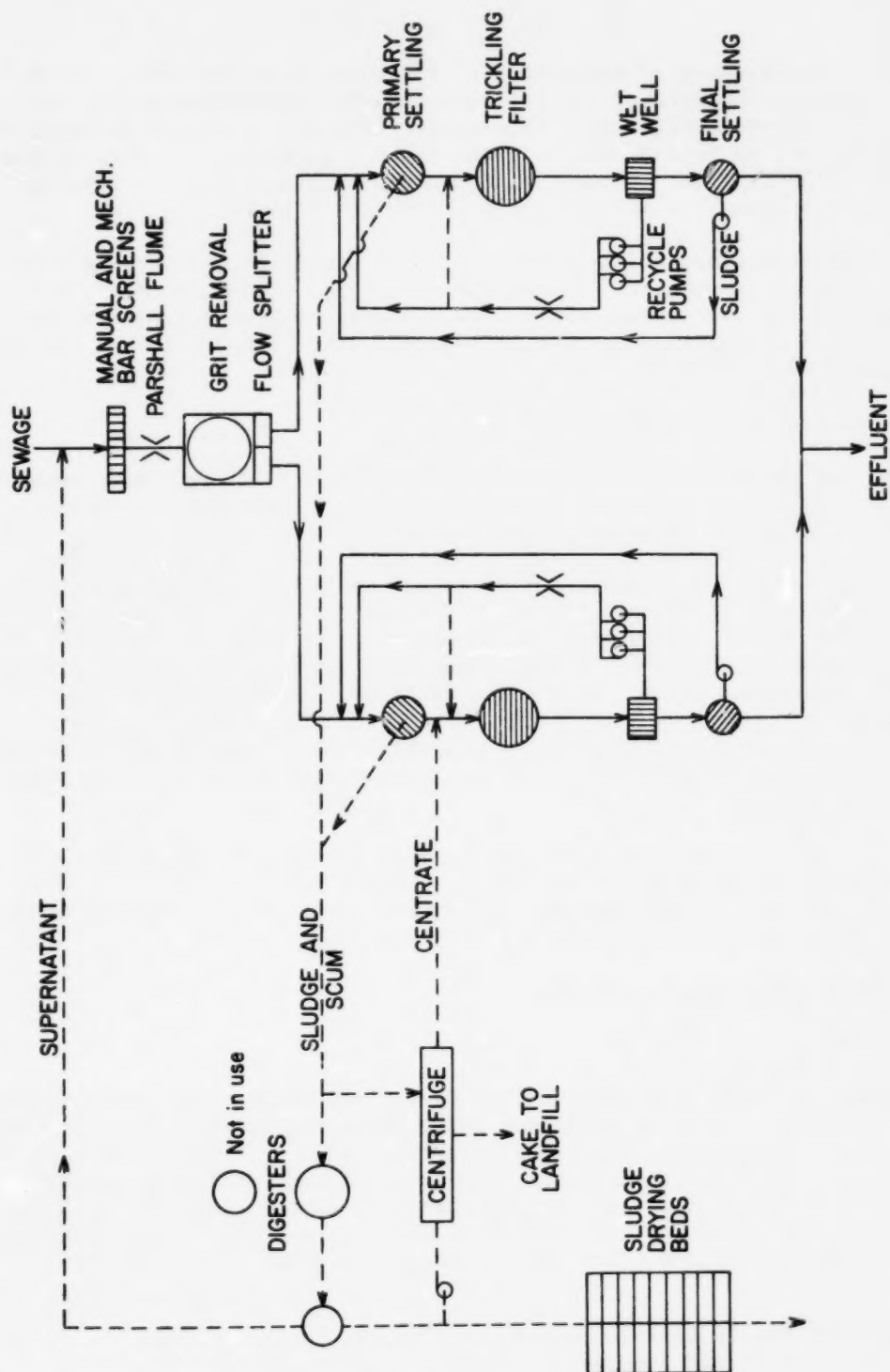


FIGURE 4-1 - PARTIAL FLOW SHEET FOR CHAPEL HILL PLANT

foot diameter digester equipped with floating cover and mixer. A 50-foot diameter digester, with infrequently used mechanical mixer, serves as a second stage digester. Supernatant from the secondary digester is decanted during periods of low plant flow at a low rate of flow to the plant influent. Gas produced in the process is utilized for heating the sludge digesters and the excess burned in a flare.

Digested sludge usually is dewatered on 18 uncovered sand drying beds. When required by weather unfavorable for sludge drying, a centrifuge is available for dewatering. This unit also may be used for dewatering undigested sludge if unusual circumstances require reduction of loading on the sludge digesters.

C. Sampling Procedures

Since the plant is only staffed by Chapel Hill for 8 hours each weekday and not at all on weekends, it was necessary to construct an automatic sampling system. Sampling points include influent, effluent from each primary tank, effluent from each trickling filter, and effluent from each final tank. The samples flow by gravity or are pumped continuously to overflowing standpipes in the operations building. A timer-controlled Blue pump¹ pumps sample water to a solenoid flop valve². The valve is in a "waste" position for a sufficient time to purge all of the sample lines (approximately 60 sec.). The valve is then switched to the "sample" position for 2 sec during which time the sample flows into sample containers stored in a 2-4°C refrigerator. Samples are collected and composited at 30 minute intervals twenty-four hours per day, five days per week.

Figure 4-2 is a photograph of the sampling system showing standpipes, Blue pump, timer, solenoid valves, and sample refrigerator. The additional solenoid valves are used for an automatic sampling system of the same design for the trickling filter pilot plants.

D. Wastewater Research Center

1. Facilities

The Town of Chapel Hill and the UNC Department of Environmental Sciences and Engineering have an agreement under which Departmental faculty have assumed responsibility for supervising operation of the treatment plant. Also, as part of that agreement, the Town has made available to the Department laboratory space at the plant for experimentation relating to plant operation and other research activities. The complex of full scale, laboratory and pilot facilities at the plant is staffed by

¹John Blue Manufacturing Company, Laurinburg, North Carolina

²Sears, Roebuck and Company, Sud Saver Valve No. 99830

Departmental professional and support personnel, comprising the "UNC Wastewater Research Center."

Analytical and research laboratories at the Center occupy six rooms with total area of 1300 square feet. Two rooms are equipped for close temperature control. One is used principally for BOD analyses and the other for fish bioassay studies or biological treatability studies.

The routine analytical laboratories are equipped for a wide variety of physical, chemical and biological work, including TOC, BOD, COD, various types of solids, turbidity, pH, volatile acids, and microbiological studies. An extensive array of Technicon Autoanalyzer equipment is available in Departmental laboratories on campus with units for determining all forms of nitrogen, phosphorus and MBAS. Also, an atomic absorption spectrometer is available in the Departmental laboratories, as well as many other types of specialized equipment which are available as may be desired.

About 500 square feet of additional space is available in the main building at the plant for bench-scale and small pilot equipment. Units available in this location include five 0.1 gpm activated sludge units which were used extensively during early phases of these studies. Adjacent to that building is an installation of four 4.0-foot diameter pilot trickling filters in a separate enclosure of about 400 square feet. An outside view of these units is shown in Figure 4-3.

A new prefabricated metal building at the Center encloses 1800 square feet of offices and space suitable for constructing and operating larger pilot plants. This building is shown in Figure 4-4.

2. Analytical Procedures

The procedures for the chemical analyses associated with this study were standard procedures and are listed in Table 4-3.

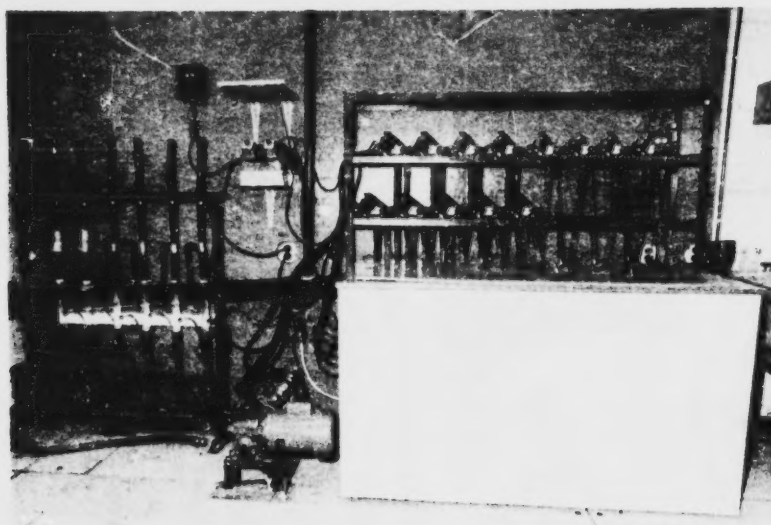


FIGURE 4-2 AUTOMATIC SAMPLING SYSTEM

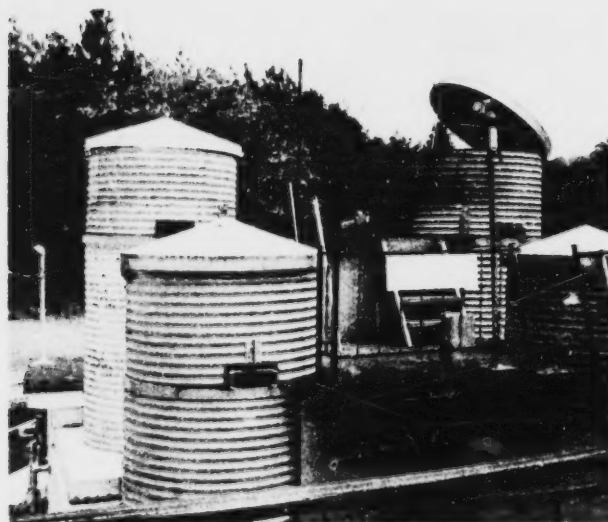


FIGURE 4-3 TRICKLING FILTER PILOT PLANTS

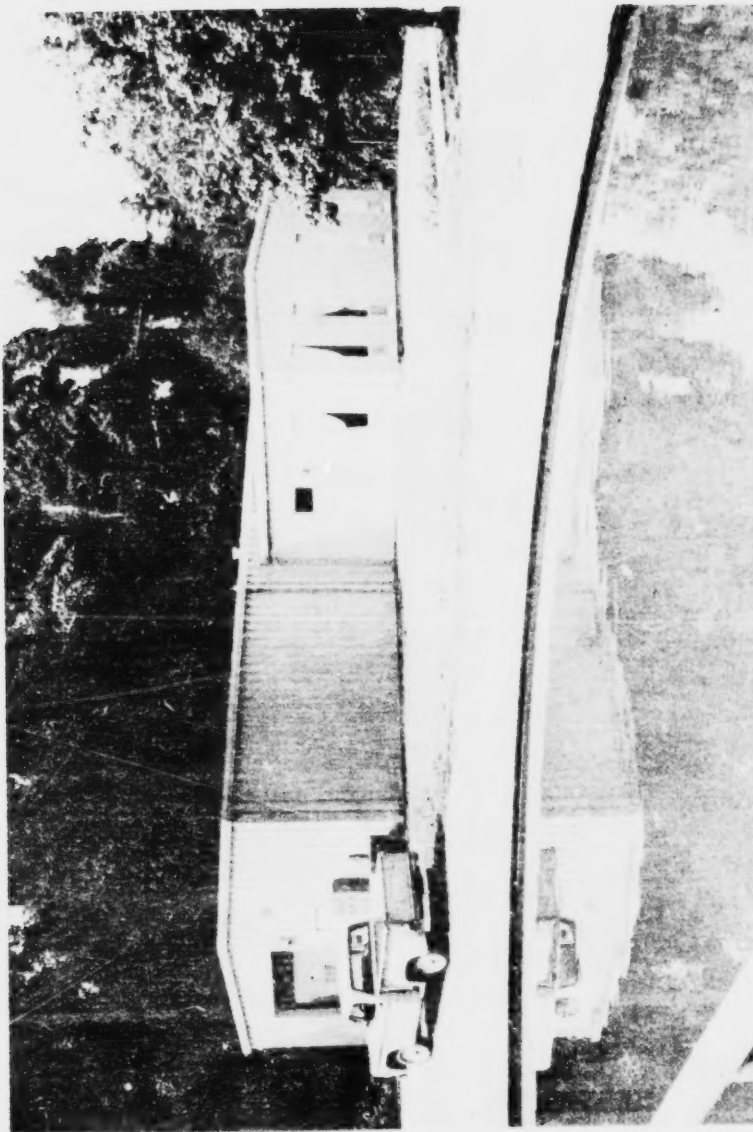


FIGURE 4-4 PILOT PLANT BUILDING, UNC WASTEWATER RESEARCH CENTER

TABLE 4-3

ANALYTICAL PROCEDURES

<u>PARAMETER</u>	<u>METHOD</u>	<u>REFERENCE</u>
Alkalinity, Total (as CaCO_3)	Electrometric Titration - pH 4.5	1
Biochemical Oxygen Demand (BOD, 5 day, 20 C)	YSI DO Analyzer (probe method) (modified blank depletion)	2
Carbon - Inorganic Organic (TOC)	Dow-Beckman Carbonaceous Analyzer Model No. 915 (Dual Channel)	1
Chemical Oxygen Demand (COD)	Dichromate reflux - 0.25 N	2
Chloride (Cl^-)	Mercuric Nitrate Titration	2
Dissolved Oxygen (DO)	Winkler-Azide or YSI DO Analyzer (probe method)	2
Methylene Blue Active Substances (MBAS)	Methylene Blue	2
Metals, Total Dissolved	Perkin-Elmer Model 303 Atomic Absorption Unit Filtration through 0.45 μ membrane filter	1
Nitrogen, Ammonia (NH_4^+-N)	Technicon AutoAnalyzer - Sodium Phenolate	1
Nitrogen, Kjeldahl, Total (Kjeld-N)	Technicon AutoAnalyzer - Digestion + Phenolate	1
Nitrogen, Nitrate (NO_3^--N)	Technicon AutoAnalyzer - Hydrazine Reduction	1
Nitrogen, Nitrite (NO_2^--N)	Technicon AutoAnalyzer - Diazotization	1
pH	Electrometric	2
Total Phosphorus (TP)	Persulfate Digestion + Technicon AutoAnalyzer Automated Stannous Chloride	1
Total Inorganic Phosphorus (TIP)	Automated (single reagent) Hydrazine Sulfate Reduction Modification*	1

TABLE 4-3 (continued)

<u>PARAMETER</u>	<u>METHOD</u>	<u>REFERENCE</u>
Solids, Total (TS)	Gravimetric, 103°C (Method 224 A)	2
Solids, Total Volatile (TVS)	Gravimetric, 550°C (Method 224 B)	2
Solids, Suspended (SS)	Gooch Crucible Filtration, 103°C (Method 224 C)	2
Solids, Volatile Suspended (VSS)	Gooch Crucible Filtration, 103°C Gravimetric, 550°C (Method 224 D)	2
Solids, Settleable	Volume (Method 224 F)	2
Solids, Suspended (after settling)	Method 224 C, on supernatant prepared by Method 224 F	2
Solids, Volatile Suspended (after settling)	Method 224 D, on supernatant prepared by Method 224 F	2
Solids, Mixed Liquor Suspended (MLSS)	Known volume of sample is centrifuged and solids removed are dried and weighed	UNC Waste-water Research Center method
Turbidity (JTU)	Hach Model 2100 Turbidimeter	Hach manual
Volatile Acids	Distillation Method (tentative)	3

¹FWPCA. 1969. *FWPCA Methods for Chemical Analysis of Water and Wastes*. U.S. Department of Interior, Federal Water Pollution Control Administration. Analytical Quality Control Laboratory, Cincinnati, Ohio.

²APHA, AWWA, WPCF. 1965. *Standard Methods for the Examination of Water and Wastewater*, 12th edition. American Public Health Association, Inc., New York, New York.

³*Ibid.*, 11th edition, 1960.

*Total Inorganic Phosphorus (Automated Method):

The unfiltered sample is treated by mild acid hydrolysis (2.5 N H₂SO₄ at 90 °C), followed by orthophosphate determination. Ammonium molybdate reacts with phosphorus in an acid medium to form a phospho-molybdate complex. This complex is reduced to an intensely blue-colored complex by hydrazine sulfate. The color is proportional to the phosphorus concentration. The result includes dissolved and suspended orthophosphates and acid-hydrolyzable phosphates originally present in the sample.

SECTION V

TRICKLING FILTER STUDIES

A. OBJECTIVES

For years, prior to the advent of package aeration plants, the trickling filter process predominated in small and medium sized wastewater treatment plants. Filters have the advantage of being able to quickly recover from shock loads and will provide good performance with a lower level of skilled technical supervision (4). The initial costs of trickling filter plants are comparable with those for activated sludge; however, operating costs are lower as power costs are substantially less (5).

A number of mathematical models have been suggested for predicting the performance of trickling filters [Velz (6), NRC (7), Rankin (8), Howland *et al.* (9, 10, 11, 12), Schulze (13, 14, 15), Stack (16), Eckenfelder (17), Galler and Gotaas (18), Lamb (19)] but there are significant differences in factors included in the models and in the performance predicted under similar conditions. Accordingly, one of the principal objectives of the experimental work described in this chapter was to determine if a reliable predictive model could be developed for the Chapel Hill plant and to examine the effect of several variables on filter-final tank performance.

Other objectives were 1) to study the effect of the pattern of recirculation on plant performance, 2) to investigate the probable effect of converting the Chapel Hill plant from single- to two-stage filtration and 3) to examine the effect of final settling tank loadings on plant performance. Because it was impossible to operate the Chapel Hill plant in two-stage filtration, this phase of the work was conducted with the use of a pilot plant. Data for other phases of the study were drawn from the operation of the full scale plant.

B. EXPERIMENTAL PROGRAM

During the period from November 18, 1969 through January 24, 1972, the two sides of the full scale Chapel Hill plant were operated experimentally to investigate the effect of a number of variables on plant performance. The three factors which could be varied were

- 1) the fraction of influent flow which could be directed to each side of the plant
- 2) the recirculation flow on each side of the plant
- 3) the pattern of recirculation.

During the experimental program the fraction of influent flow to each side of the plant was manipulated with the use of the division plate downstream from the grit removal chamber. Flow divisions ranged from a 0-100 percent split to a 50-50 percent split. The various divisions used during the experimental program were 50-50, 33-67, 20-80 and 0-100. The 0-100 percent division experiment was conducted during a period when one of the filters was out of service for an extended period to replace filter distributor arms.

Recirculation flow was varied with the use of various combinations of the three recirculation pumps available on each side of the plant. Minor variations were obtained by throttling individual pump discharges. During the experimental program recirculation flow varied from 0.65 mgd to 4.20 mgd.

The ability to vary influent flow division to each side of the plant and the recirculation flows allowed variation in other factors which are normally included in mathematical models for predicting trickling filter performance, i.e., hydraulic loading, organic loading and recirculation ratio. During the series of experiments the hydraulic loading on the filters ranged from a low of 5.4 mgd to a high of 22.5 mgd; organic loading, from 265 to 35 lbs BOD/day/acre-feet (6.1-80.5 lbs/day/1000 ft³); and the recirculation ratio [(recirculation flow)/(influent flow to a side)], from 0.27 to 6.94. Wastewater temperature was recorded daily and ranged from a low of 11.0 °C to a high of 28.0 °C.

During the experimental work sufficient data were obtained with equal influent flow division and equal recirculation flows on each side to determine whether the two sides of the plant would produce equal results under equal loading conditions.

The pattern of recirculation flow was also varied during one period. The normal pattern of recirculation at the Chapel Hill plant is to return filter effluent to the head end of the primary settling tank. An alternate method permits recirculation directly around the filters.

C. SAMPLING, ANALYSES AND DATA HANDLING

During the experimental program with the full scale trickling filters daily composite samples of wastewater were obtained from the following points in the plant:

Influent, following screening and grit removal

Primary Settling Tank Effluent, from each of the two primary settling tanks

Trickling Filter Effluent, from each of the two filters

Final (Secondary) Settling Tank Effluent, from each of the two final settling tanks.

Samples were collected with a heavy duty multitube type pump. During the sampling cycle all sample pump discharge lines were flushed before the sample was diverted to the accumulation containers. Sample containers were stored in a cold chest held at approximately 4° C. All analytical and operating data collected during the main plant experimental program are shown in Appendix A. Analytical procedures are described in Section IV.

Several months after the initiation of data collection it was realized that accurate analysis of the data being accumulated would require the use of a computer. It was decided to store all of the main plant data on a computer generated file from which specific data could be selected for report printing or statistical analysis. In addition, it was felt that the data collected during this study would be of use to other investigators and should be in a form that could be readily transferred.

Rather than develop our own file-handling system, we utilized the file capabilities of a system known as the Statistical Package for the Social Sciences (SPSS, National Opinion Research Center, University of Chicago). This system allows calculations from raw data and storage of new variables such as hydraulic loading. In addition, the statistical section of SPSS allows ready statistical analysis of any or all data in the master file. If SPSS is unsuitable for a particular report format or statistical analysis, it allows the creation of an output file which may then serve as an input file to any other statistical or report-generating program.

The entire master file for the period November 19, 1969 to January 24, 1972 is permanently stored at the Computation Center of the University of North Carolina on a magnetic tape, UT3500. Requests for copies of this tape and the tape format may be addressed to the authors. The data in this file is reproduced in Appendix A of this report.

D. EQUALITY OF THE TWO SIDES OF THE PLANT

- One of the principal objectives of the experimental work with the main plant was to determine the effect of the several variables, i.e., organic loading, hydraulic loading, recirculation ratio and temperature, on plant performance. The logical first step was to determine if the two sides of the plant would produce comparable results under conditions of equal loading and temperature on each side. Accordingly, during three separate periods within the experimental program, the operating variables were constant. The mean overall plant performance in terms of percent removal of BOD₅, SS and TOC is shown below:

TABLE 5-1

MEAN OVERALL PERCENT REMOVAL OF BOD₅, SS AND TOC DURING PERIODS OF
EQUAL LOADING ON THE TWO SIDES OF THE PLANT

	<u>11/18 - 12/15/69</u>			<u>3/1 - 4/7/71</u>			<u>11/25 - 12/21/71</u>		
	<u>BOD₅</u>	<u>SS</u>	<u>TOC</u>	<u>BOD₅</u>	<u>SS</u>	<u>TOC</u>	<u>BOD₅</u>	<u>SS</u>	<u>TOC</u>
Side 1	75.2	79.6	62.2	54.7	59.9	45.0	73.6	80.2	71.1
Side 2	75.5	78.1	61.6	58.7	58.1	48.3	73.6	75.5	67.9

Statistical analysis of the individual items of data which resulted in the mean removals shown in Table 5-1 indicated that the two sides of the plant could be considered equal in regard to performance when operated under the same loading conditions. This is an important conclusion as it allowed the data collected on Side 1 to be analyzed with the data collected on Side 2 as if all observations had been made on one side only.

E. PATTERN OF RECIRCULATION

The effect of recirculation pattern on plant performance was studied by recirculating filter effluent through the primary settling tank on one side of the plant, while recirculating directly around the filter on the other side, as shown in Figure 5-1.

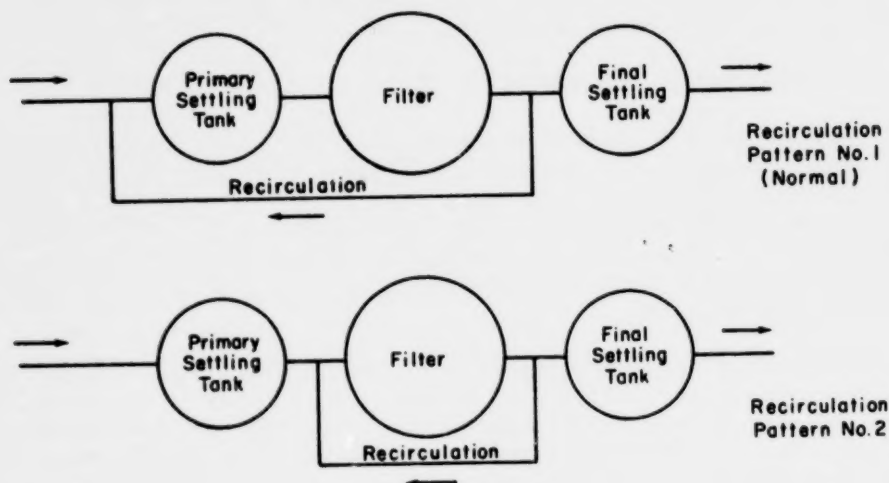


FIGURE 5-1
POSSIBLE PATTERNS OF RECIRCULATION AT THE CHAPEL HILL PLANT

This method of operation was maintained during the period from 7/16 through 8/24/72. The pattern of recirculation on the two sides was reversed during the period 9/8 through 9/21/71. Influent flow was split 50-50 and the recirculation ratio was maintained the same on both sides during each test period. During both experiments, the side in which recirculation was through the primary tank yielded slightly better performance. Average results in terms of overall removal of BOD and SS on the two sides are shown in Table 5-2.

TABLE 5-2

OVERALL PERCENT REMOVAL OF BOD AND SS WITH TWO PATTERNS OF RECIRCULATION

	7/16 - 8/24/72		9/8 - 9/21/72	
	Pattern No. 1 Side No. 1	Pattern No. 2 Side No. 2	Pattern No. 2 Side No. 1	Pattern No. 1 Side No. 2
BOD	81.7	79.2	83.1	85.1
SS	76.6	78.0	88.1	89.1

One important effect of recirculation through the primary tanks in the Chapel Hill plant is the reduction of odors. Filter effluent normally has a dissolved oxygen concentration of 4 to 6 mg/l. The mixing of recirculated flow with raw sewage tends to keep the mixture reasonably fresh as it passes through the primary settling tanks. Primary settling tank detention time at the Chapel Hill plant, at an influent flow of 3.0 mgd and a recirculation ratio of 2.0, is 1.9 hours. When recirculation is directly around the filter the detention time in the primary tanks increases to 5.4 hours and serious odor problems result.

F. MATHEMATICAL MODELS FOR TRICKLING FILTER PLANT PERFORMANCE

As mentioned previously various mathematical models have been suggested by different investigators. Although engineers have used these models as a convenient design tool, none have been generally accepted as a truly reliable predictive device. Any model which is generally valid would be an aid to optimum filter design or to more efficient operation of existing plants in cases where the designer has provided some degree of operating flexibility.

Mathematical models for trickling filter performance can be divided into two general types, i.e., regression models and rational or semi-rational models. Existing models are all based on predicting removal of BOD. Accordingly, the BOD data collected in the Chapel Hill plant were analyzed in comparison with several widely known models. In addition a new regression equation was developed specific to the observed BOD removal at Chapel Hill.

It should be noted that all trickling filter models discussed here are designed to predict removal of BOD through filters and final settling tanks, where the final settling tank is considered to be an integral part of the filter system. Little attention has been given to the effect of final settling tank detention time or surface loading on combined performance of the system.

1. Regression Models

Galler and Gotaas (18) developed a regression equation to fit 322 observations from various trickling filter treatment plants. Data included observations relative to filter depth, hydraulic loading, organic loading, recirculation ratio, and wastewater temperature. The equation which they reported was

$$Le_a = 0.31 Lo_a^{1.19} (1+D)^{-0.67} T^{-0.15} (Q/I)^{-0.72} Q^{-0.06} \quad (5-1)$$

in which Le_a = final settling tank effluent BOD in lbs/acre/day

Lo_a = BOD applied to filter in lbs/acre/day
(primary settling tank effluent including recirculation if any)

Q = filter hydraulic loading (mgad)
(influent flow and recirculation flow)

I = influent flow (mgad)

D = filter depth in feet

T = wastewater temperature, °C

Note: $Q/I = 1 + R_r$ in which R_r is the recirculation ratio, i.e., (recirculation flow)/(influent flow).

Galler and Gotaas reported a multiple correlation coefficient of 0.974 for Equation 5-1.

To test the validity of Equation 5-1 a total of 329 complete daily cases in which there were no missing observations were selected from the total data file. These data included results from both sides of the Chapel Hill plant. A linear regression analysis was conducted with the aid of a computer. The linear form of the equation was

$$\ln Le_a = B_0 + B_1 \ln Lo_a + B_2 \ln (Q/I) + B_3 \ln T + B_4 \ln Q$$

A term in filter depth was not included as depth was not a variable during the Chapel Hill plant experiments. The resulting regression equation in exponential form is

$$Le_a = 20.16 Lo_a^{0.67} Q^{0.72} (Q/I)^{-1.37} T^{-0.69} \quad (5-2)$$

The multiple correlation coefficient for Equation 5-2 is 0.84.

In Equation 5-1 the exponent 1.19 on Lo_a indicates decreasing overall BOD efficiency with increasing BOD loading; in Equation 5-2 the exponent 0.67 indicates the opposite relationship. Galler and Gotaas concluded that ".... the hydraulic (loading) rate did not contribute any significant effects to BOD removal efficiency." This conclusion was based on the low value (close to zero) of the exponent on Q in Equation 5-1. On the other hand, the term $Q^{0.72}$ makes a statistically highly significant contribution in Equation 5-2, based on the Chapel Hill plant performance. The exponent on temperature derived from Chapel Hill data implies that temperature is a more important factor in plant performance than indicated by Equation 5-1. Lastly, Equation 5-2 indicates that increased levels of recirculation are more significant in improving plant performance than suggested in Equation 5-1.

Another regression analysis was conducted in which terms Lo and Le were expressed in more conventional filter organic loading units, i.e., lbs of BOD/day/acre-foot of filter volume. In addition, the value of Lo was based on settled raw sewage BOD (SRS-BOD) and not on the mixture of settled raw and recirculated flow. The value of SRS-BOD was calculated on the basis of the primary settling removal curve presented in Fair, Geyer and Okun (20) as simulated by the following computer developed relation:

$$SRS-BOD = INF-BOD (1 - \text{Primary Tank Removal})$$

$$\text{and Primary Tank Removal} = 3.77 (\bar{t}_p/10) - 18.1 (\bar{t}_p/10)^2 + 54.7 (\bar{t}_p/10)^3 \\ - 99.2 (\bar{t}_p/10)^4 + 103 (\bar{t}_p/10)^5 - 55.8 (\bar{t}_p/10)^6,$$

in which $\bar{t}_p$ = detention time in primary tank in hours.

The values of Le and Lo used in the regression equation presented below (5-3) and in the rational and semi-rational models described later were calculated as follows:

$$Le = 8.34 (\text{Final Effluent BOD}_5)(\text{Influent Flow})/(\text{Filter Volume}),$$

$$Lo = 8.34 (\text{SRS-BOD})(\text{Influent Flow})/(\text{Filter Volume}).$$

The resulting regression equation, in exponential form is,

$$Le = 9.84 Lo^{0.86} T^{-0.95} (1+Rr)^{-0.84} Q^{0.56} \quad (5-3)$$

The multiple correlation coefficient for Equation 5-3 is 0.82. The exponents on the terms in Equation 5-3 are different from those of Equation

5-2 due to the difference in the way Lo_a and Lo were computed in each case.

2. Rational and Semi-Rational Models

a. Rational Models

One of the first rational models for predicting trickling filter performance was that developed by Velz (6). After observing the removal of BOD at various depths in filters, Velz postulated that the BOD removal in each increment of filter depth was proportional to the BOD remaining, as can be represented by the simple differential equation

$$dL/dD = -k_1 L$$

which integrates to

$$Le/Lo = e^{-k_1 D}$$

in which Le and Lo are settled filter effluent and settled raw wastewater influent BOD, respectively, and may be expressed in any consistent and convenient units.* D is the depth of the filter and k_1 is the BOD removal rate constant in units of (distance)⁻¹. Most of Velz's observations were at reasonably constant hydraulic loadings, hence the time the wastewater remained in the filter was directly proportional to filter depth.

Howland (9) recognized that liquid retention time in a filter was a function of both depth and hydraulic loading. Analyzing the flow of liquid over spheres, he demonstrated that liquid retention time was functionally related to hydraulic loading. For BOD removal he used the expression

$$Le/Lo = e^{-kt}$$

in which k is a constant in units of (time)⁻¹, and t , the time the wastewater is in the filter, can be represented by

$$t = C \cdot D/Q^n$$

in which C = a constant related to the geometry of the filter media

n = a constant related to the type of flow over the media,
i.e., laminar, turbulent or mixed.

For laminar flow Howland determined that n was equal to 2/3; for turbulent conditions, 1/3. It can also be shown that these exponents are appropriate for laminar and turbulent flow over inclined flat plates.

*In all rational models discussed in this report Lo refers to settled raw wastewater BOD, calculated as previously described.

Howland (12) also suggested a temperature correction factor for the rate constant k as follows:

$$k_t = k\theta$$

in which $\theta = (1.035)^{T-20}$.

Howland's model for removal of BOD in a trickling filter under laminar flow conditions without recirculation can be expressed as

$$Le/Lo = \exp (-k_t \cdot C \cdot D/Q^{2/3}). \quad (5-4)$$

Schulze (14) tested Howland's model with a pilot trickling filter constructed of vertical screens and obtained reasonably good agreement.

Eckenfelder (17) modified Howland's equation to account for a decreasing amount of active slime surface with increased depth in a filter by including an exponent less than one on the depth term. He further modified the equation to account for a decrease in the ease of removal of the various wastewater constituents remaining with increasing depths in the filter, as shown below

$$Le/Lo = \exp (-x) = 1/(1 + x + x^2/2! + x^3/3! + \dots).$$

Eliminating all but the first two terms in the series expression, a so-called retardant form is obtained, i.e.,

$$Le/Lo = 1/(1 + x). \quad (5-5)$$

The general effect of the retardant form is shown in Figure 5-2.

Following statistical analysis of performance of stone-media filters, Eckenfelder proposed the following model:

$$Le/Lo = 1/(1+K \cdot D^{2/3}/Q^{1/2}). \quad (5-6)$$

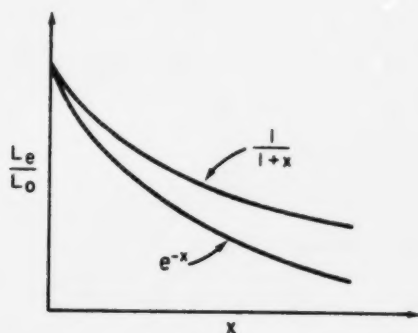


FIGURE 5-2 EFFECT OF RETARDANT MODEL

The factor K combines the rate constant and factors related to the geometry of the filter media. A value of 2.5 was suggested for stone-media filters.

Eckenfelder suggested that recirculation be treated as a dilution of filter influent. Assuming that filter effluent BOD is equal to L_e when it has passed through either a primary or secondary settling tank, as illustrated in Figure 5-3, the following expression can be developed:

$$L_m = (L_o + R_r L_e) / (1 + R_r) \quad (5-7)$$

in which L_m = BOD_5 , mg/l, of the mixture of settled raw sewage and settled recirculation flow leaving the primary settling tank.

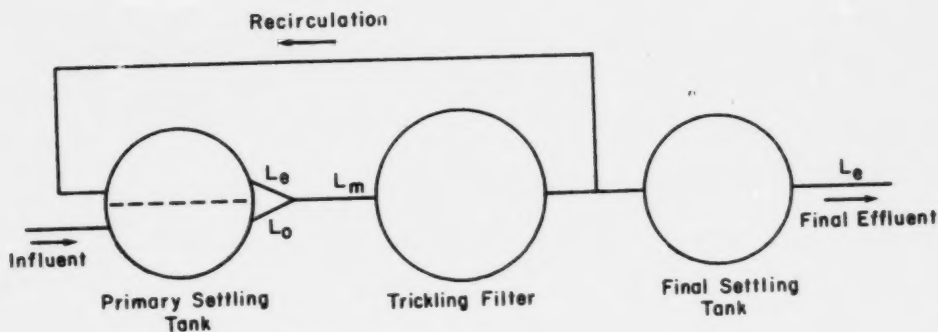


FIGURE 5-3 MIXTURE OF INFLUENT AND RECIRCULATION FLOWS

Substitution of Equation 5-7 in Equation 5-5, yields $L_e/L_m = 1/(1+x)$.

With some manipulation, the following relation may be obtained:

$$L_e/L_o = 1/[1 + x (1 + R_r)] \quad (5-8)$$

in which $x = K \cdot D^m / Q^n$.

It is the writers' belief that models of the type represented by Equation 5-8 merit further development. The effect of specific surface area of the filter media can easily be included. The effect of turbulence in enhancing transfer of organics to the slime layers and the effect of periodicity of wastewater dosage call for further investigation. Nevertheless, further development of the type of models suggested by Howland and Eckenfelder seems to offer the best possibility of increased understanding of trickling filter performance.

An equation in the form of 5-8, in which a temperature correction factor (T^α) was included, was fitted to the Chapel Hill data using a nonlinear regression technique. The nonlinear method was selected, as all transforms devised to express the equation in linear form yielded unsatisfactory results.

The nonlinear program was developed in the Department of Biostatistics, School of Public Health, the University of North Carolina at Chapel Hill. Given the form of the function, with its parameters and variables, the program gives the values of the parameters which minimize the sum of the squares of the residuals (the residual is the difference between the observed value of the dependent variable and the value of the dependent variable predicted by the model of best fit). The program uses an iteration procedure similar to that described by Nelder and Mead (21). The same technique was used in fitting Equation 5-11 described later (the NRC formula).

The nonlinear regression analysis of the modified Eckenfelder model (Equation 5-8) yielded the following equation of best fit:

$$Le = Lo/[1 + 0.0055(1 + Rr) Q^{-0.38} T^{1.79}]. \quad (5-9)$$

Equation 5-9 is not as different from the original Eckenfelder model as might appear at first inspection. If the actual value of $T^{1.79}$ at 20° C is included in the constant, the resulting expression is

$$Le = Lo/[1 + 1.17 (1 + Rr) Q^{-0.38}].$$

b. Semi-rational Models

A well known semi-rational model is the NRC formula developed from extensive data collected at military installations during World War II (7). This model is as follows:

$$E = 1/[1 + 0.0085 (W/VF)^{1/2}] \quad (5-10)$$

in which E = the BOD removal efficiency of the filter and the final settling tank as a decimal fraction

W = lbs of settled raw wastewater BOD/day applied to the filter

V = the volume of the filter in acre-feet

F = the filter recirculation factor = $(1 + Rr)/(1 + Rr/10)^2$.

It should be noted that W/V is equivalent to Lo as previously described. Lo in turn is a product of influent flow and settled raw sewage BOD concentration. Hence to a certain extent the NRC formula includes factors related to organic loading, hydraulic loading and recirculation ratio. The application of the NRC formula for typical domestic wastewater has

been questioned as it was developed from data obtained from the treatment of strong military-base sewage.

An expression in the form of Equation 5-10 was fitted to the Chapel Hill plant data using the nonlinear regression technique previously described. The resulting equation of best fit was

$$E = 1/[1 + 14.62(Lo/F)^{0.44} T^{-1.85}]. \quad (5-11)$$

Another common semi-rational model was developed by Rankin and has been adopted for use in the Ten State Standards (22). For plants similar to Chapel Hill's, Rankin's method suggests that if the hydraulic loading on the filter is between 10 and 30 mgad the filter-final settling tank efficiency is strictly a function of the recirculation ratio. Actual hydraulic and organic loadings are not considered.

c. Comparison of the Models

A comparison of the regression Equation 5-3 and the modified forms of the Eckenfelder model (Equation 5-9) and NRC formula (Equation 5-11) was necessary to determine which relation provided the best fit to the Chapel Hill data. Because Equations 5-9 and 5-11 were determined by nonlinear regression methods it was impossible to find a value for the multiple correlation coefficient for these equations, so that a comparison of correlation coefficients was not possible. To make the desired comparison the three equations were all reduced to the general form $Le/Lo = x$ by dividing both sides of the equation by Lo .

For Equation 5-3 the result is

$$Le/Lo = 9.84 Lo^{-0.14} T^{-0.95} (1 + Rr)^{-0.84} Q^{0.56}. \quad (5-12)$$

A plot of Le/Lo vs x , i.e., the entire right hand side of Equation 5-12, is shown in Figure 5-4. The plotted observed values of Le/Lo show a remarkable degree of scatter around the predictive line. The value of Equation 5-12 as a reliable predictor of daily plant performance is, therefore, quite dubious. When Equation 5-3 is analyzed, the sum of the squares of the differences between observed and predicted values of Le is 1.142×10^7 .

For Equation 5-9, the modified version of the Eckenfelder model, the $Le/Lo = x$ form is

$$Le/Lo = 1/[1 + 0.0055(1 + Rr) Q^{-0.38} T^{1.79}]. \quad (5-13)$$

A plot of the predicted and observed values of Le/Lo is shown on Figure 5-5. There is no apparent improvement in regard to the reliability of daily performance predictions based on this model. From the analysis of Equation 5-9, the sum of the squares of the difference between observed and predicted values of Le is 1.132×10^7 .

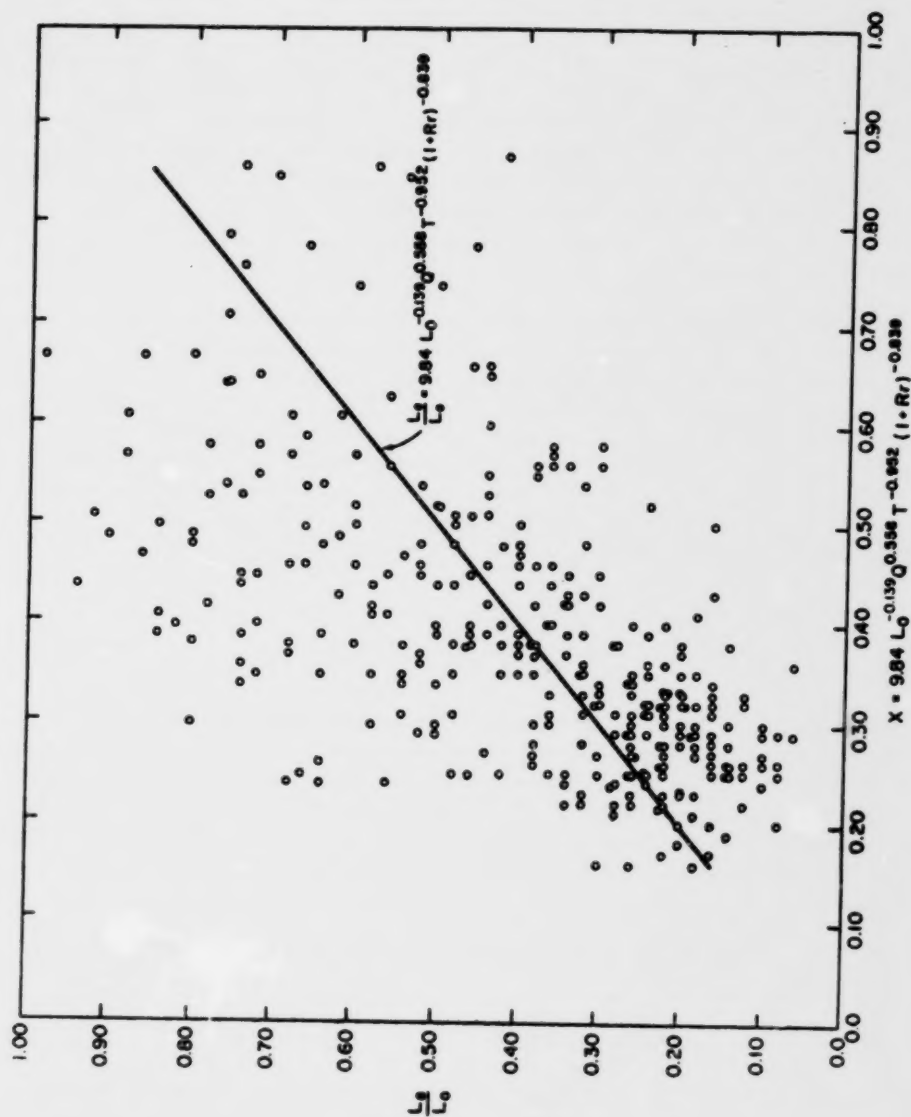


Figure 5-4. Scatter Diagram of Predictive Equation 5-12 Derived From Linear Regression Analysis.

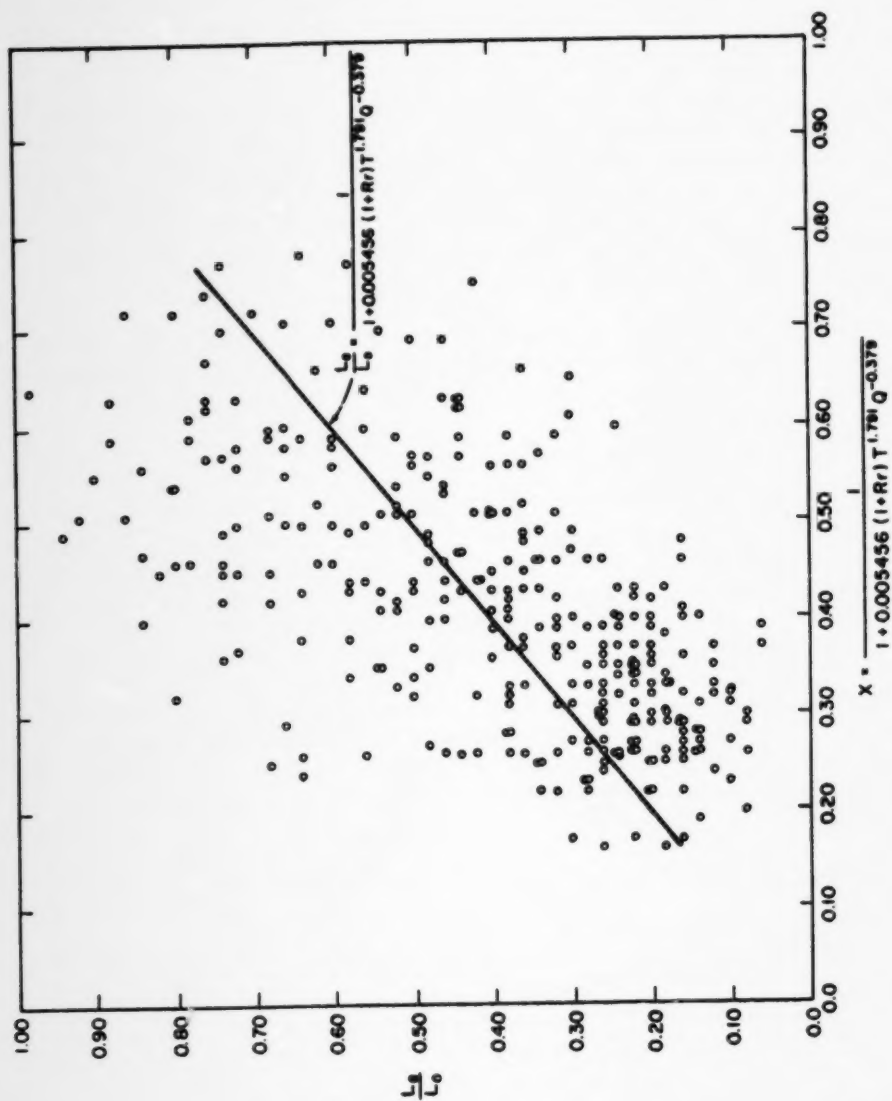


Figure 5-5. Scatter Diagram of Predictive Equation 5-13 in a Form Similar to Eckenfelder's Model.

For Equation 5-11, the modified version of the NRC formula, the $Le/Lo = x$ form is

$$Le/Lo = 1 - 1/[1 + 14.62 (Lo/F)^{0.44} T^{-1.85}] \quad (5-14)$$

A plot of the predicted and observed values of Le/Lo is shown in Figure 5-6. Again the scatter of observed values around the predictive line is substantial. From the nonlinear regression analysis of Equation 5-11, the sum of the squares of the differences between observed and predicted values of Le is 1.230×10^7 .

It is apparent that none of the filter performance models tested is very reliable as a predictor of daily plant performance. Also, the sum of the squared residuals is not sufficiently different for the three models to indicate that one is superior. All the models are useful in predicting average performance at the Chapel Hill plant over a long period of time during which operating conditions, daily wastewater flow and temperature are reasonably constant.

In the discussion of the effects of individual variables following, some general ideas are presented on how the reliability of filter performance might be enhanced in new designs.

3. Effect of Variables on Performance

Analysis of regression Equations 5-3, 5-9, and 5-11 as regards the effect of variation in individual variables, i.e., organic loading (Lo), hydraulic loading (Q), recirculation ratio (R_r), and temperature (T), provides some insight into relative importance of the variables as related to filter-final tank performance. Such an analysis was conducted using Equations 5-12, 5-13, and 5-14, in the manner described below.

In each of the three equations the values of the several variables were held constant at the mean value of the respective variable during the 329 cases in the experimental program. The variable under examination was then changed incrementally and the effect on BOD remaining (Le/Lo) was calculated.

Mean values of the 329 experimental cases are as follows

$$\begin{aligned} Lo &= 850 \text{ lbs BOD/day/acre-foot} \\ T &= 21.2^\circ \text{ C} \\ (1+R_r) &= 3.53 \\ Q &= 15.93 \text{ mgad (influent flow + recirculation flow)} \\ I &= 4.43 \text{ mgad (influent flow).} \end{aligned}$$

1) Effect of Organic Loading, Lo

Using the values above for all variables except Lo , the several equations reduce to the following forms:

Equation 5-12, linear regression model --

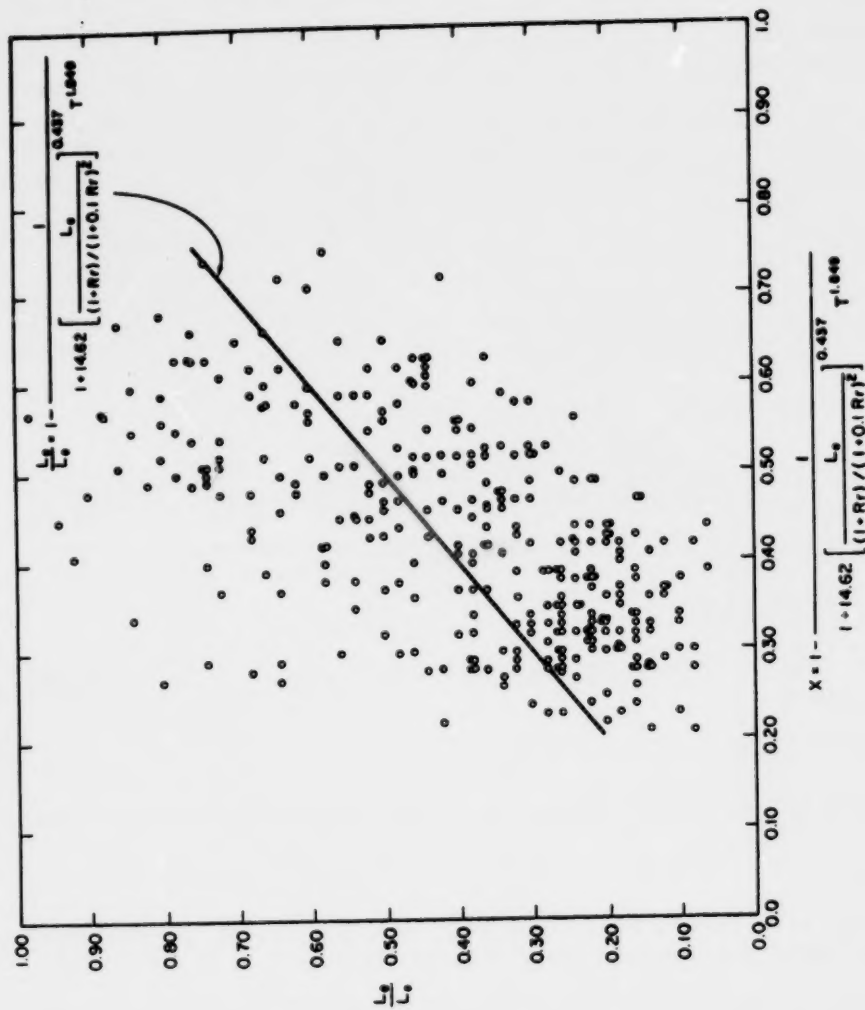


Figure 5-6. Scatter Diagram of Predictive Equation 5-14 in the General Form of the NRC Formula.

$$Le/Lo = 0.874 \cdot Lo^{-0.14},$$

Equation 5-13, nonlinear regression model of modified Eckenfelder-type equation --

$$Le/Lo = 0.383, \text{ i.e., organic loading has no effect.}$$

Equation 5-14, nonlinear regression model of modified NRC equation --

$$Le/Lo = 1 - 1/(1 + 0.0362 Lo^{0.44}).$$

The calculated effects on Le/Lo resulting from variation in Lo are shown in Table 5-3 and on Figure 5-7.

As can be seen the three models predict entirely different effects as a result of variations in organic loading. The writers are inclined to favor the results produced by Equations 5-12 or 5-13 over those of Equation 5-14. As Equation 5-12 was developed with unbiased linear regression techniques it may be closest to the truth. The lower removals at low organic loadings predicted by Equation 5-12 may possibly indicate that the slime layers in the lower section of the filter were receiving too little organic material to maintain the same adsorptive capacity as slime layers located higher in the filter.

2) Effect of Temperature

The three equations reduce to the following forms in terms of temperature, T , when all other variables are held constant at mean values:

Equation 5-12, linear regression model --

$$Le/Lo = 6.27 T^{-0.95}.$$

Equation 5-13, nonlinear regression model of modified Eckenfelder-type equation --

$$Le/Lo = 1/(1 + 0.0067 T^{1.79}).$$

Equation 5-14, nonlinear regression model of modified NRC equation--

$$Le/Lo = 1 - 1/(1 + 195.6 T^{-1.85}).$$

The calculated effects of Le/Lo resulting from variations in temperature are shown in Table 5-4 and on Figure 5-8.

As can be seen in Figure 5-8, all three models show a similar and pronounced effect on filter-final settling tank efficiency due to changes in wastewater temperature. The effect may be partly due to a gradual change in activity of filter biota with temperature. On the other hand, it was observed that reasonably high efficiency was maintained even

TABLE 5-3

EFFECTS OF VARIATIONS IN L_0 ON FILTER-FINAL SETTLING TANK PERFORMANCE

L_0	L_e/L_0		
	Eq. 5-12	Eq. 5-13	Eq. 5-14
300	0.396	No effect	0.304
400	0.380		0.332
500	0.368		0.354
600	0.359		0.372
700	0.352		0.388
800	0.345		0.402
900	0.340		0.414
1000	0.335		0.426
1100	0.330		0.436
1200	0.326		0.445
1300	0.322		0.454
1500	0.316		0.469
1800	0.308		0.489
2000	0.304		0.501
2500	0.295		0.525
3000	0.287		0.545
4000	0.276		0.576

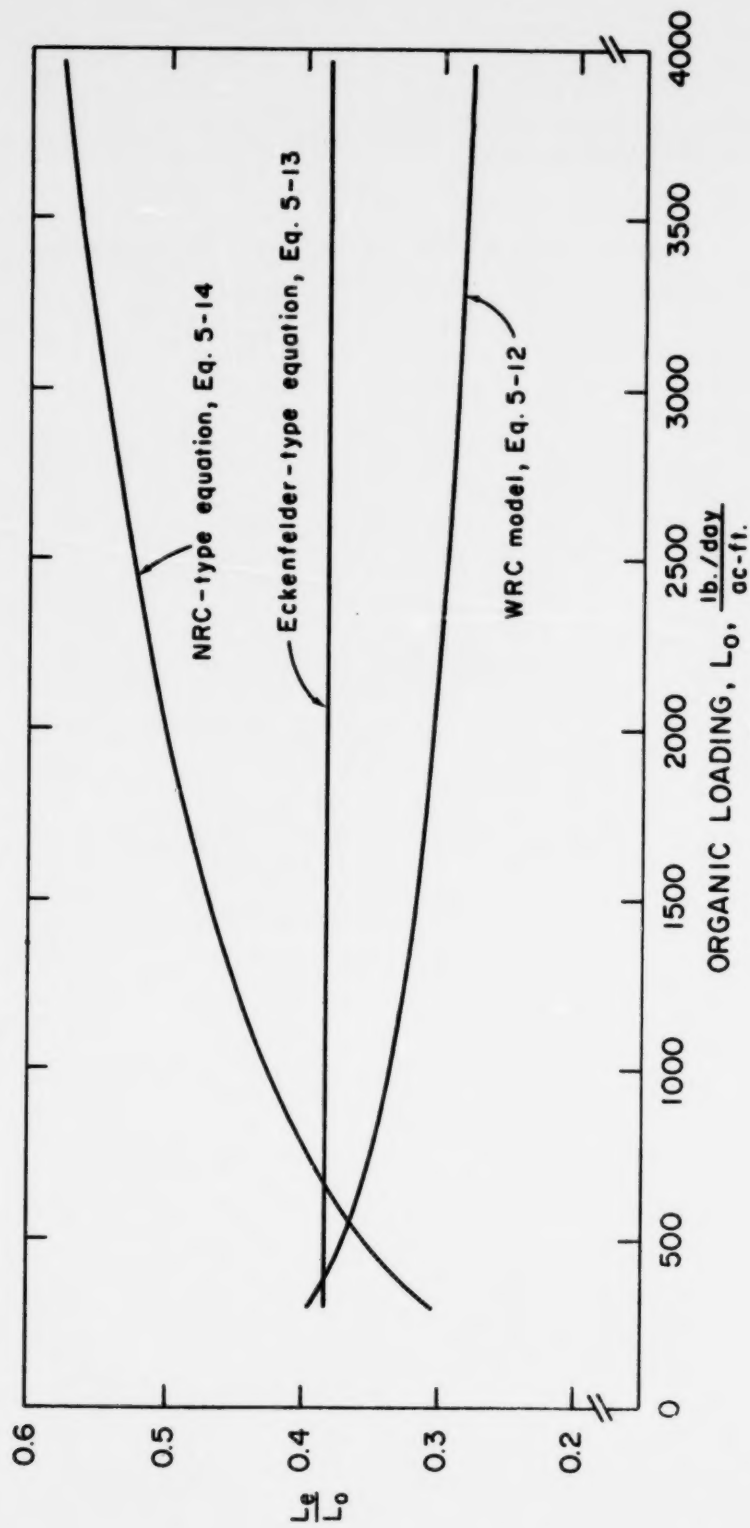


FIGURE 5-7. EFFECT OF ORGANIC LOADING ON FRACTION OF BOD REMAINING.

TABLE 5-4

EFFECTS OF WASTEWATER TEMPERATURE ON FILTER-FINAL SETTLING TANK
PERFORMANCE

	Le/Lo		
	Eq. 5-12	Eq. 5-13	Eq. 5-14
14	0.510	0.568	0.598
15	0.476	0.537	0.567
16	0.447	0.508	0.537
17	0.422	0.481	0.509
18	0.400	0.456	0.483
19	0.380	0.432	0.458
20	0.362	0.409	0.435
21	0.345	0.388	0.413
22	0.330	0.369	0.392
23	0.317	0.350	0.372
24	0.304	0.333	0.354
25	0.293	0.317	0.337
26	0.282	0.302	0.321

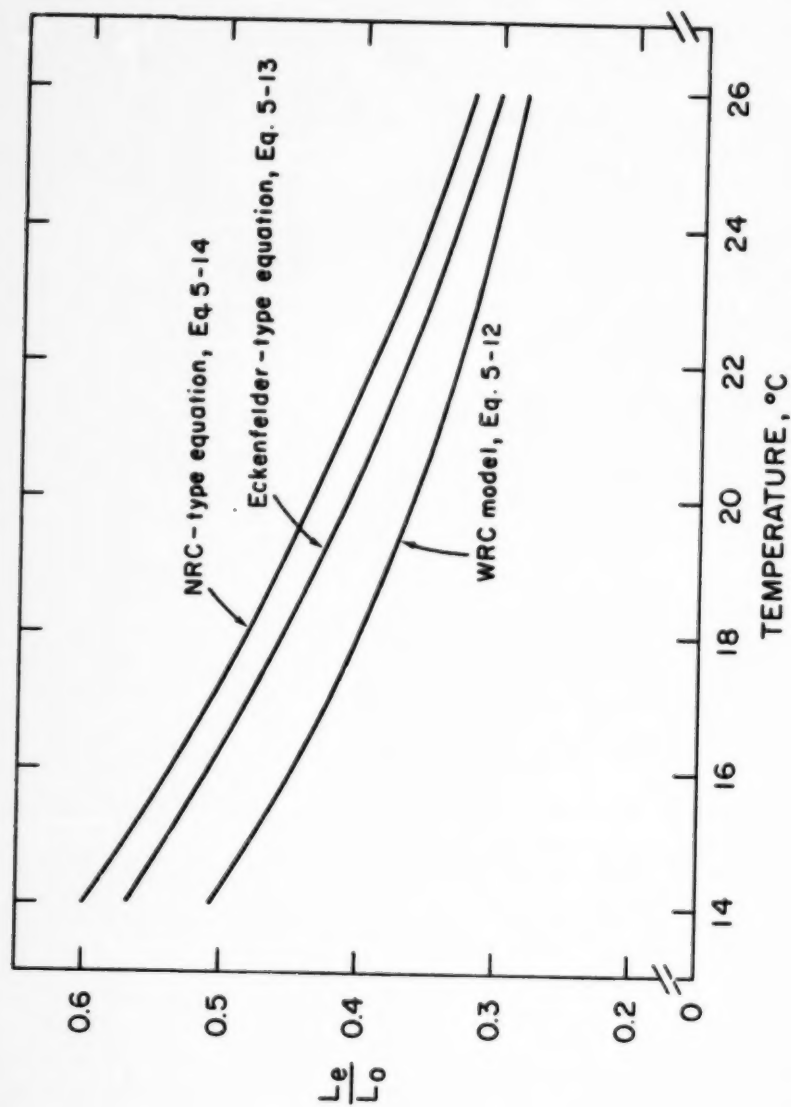


FIGURE 5-8. EFFECT OF TEMPERATURE ON FRACTION OF BOD REMAINING.

after wastewater temperatures had declined in the fall. Furthermore, lower efficiencies typical of winter operation often persisted after wastewater temperatures had significantly increased in the late spring. Inspection of the filters revealed that lower efficiencies were coincidental with the accumulation of inert humus-like material in the filter media. This accumulation appeared to be related to the density of the filter fly larvae populations in the filters (23) and was rapidly dislodged with the reappearance of larvae in the late spring. The enhancement of filter performance during periods of increased larval activity has also been noted in Britain (24). Although all of the predictive equations analyzed indicate a pronounced temperature effect, the fact that changes in filter efficiency lag significantly behind the changes in wastewater temperature is not accounted for. This effect partially accounts for the high degree of scatter in observed and predicted values of Le/Lo .

One might speculate that the predictability of filter performance, and perhaps performance itself, could be enhanced with the use of filter media designed to minimize the possibilities for the accumulation of humus-like materials.

3) Effect of Hydraulic Loading

With all variables except hydraulic constant at mean experimental levels, the three equations reduce to the following forms:

Equation 5-12, linear regression model --

$$Le/Lo = 0.073 Q^{0.56}.$$

Equation 5-13, nonlinear regression model of modified Eckenfelder-type equation --

$$Le/Lo = 1/(1 + 4.573 Q^{-0.38}).$$

Equation 5-14, nonlinear regression model of modified NRC equation--

$$Le/Lo = 1 - 1/1 + 0.686, \text{ i.e., hydraulic loading has no effect.}$$

The calculated effects on Le/Lo resulting from variations in hydraulic loading are shown in Table 5-5 and on Figure 5-9.

TABLE 5-5
EFFECT OF HYDRAULIC LOADING ON FILTER-FINAL SETTLING TANK PERFORMANCE

Q (mgad)	Le/L ₀		
	Eq. 5-12	Eq. 5-13	Eq. 5-14
4	0.158	0.270	No effect
6	0.198	0.301	
8	0.233	0.325	
10	0.264	0.344	
12	0.292	0.359	
14	0.318	0.373	
16	0.343	0.385	
18	0.366	0.395	
20	0.389	0.405	
22	0.410	0.414	
24	0.430	0.422	
26	0.450	0.429	
28	0.469	0.436	
30	0.487	0.442	

It is obvious that hydraulic loading has a significant effect on filter-final settling tank performance. The apparent zero-effect in Equation 5-14 is simply an artifact of the model, i.e., no Q term is directly included in the model.

4) Effect of Recirculation Ratio

An increase in recirculation ratio (Rr) also increases the hydraulic loading (Q). Assuming a constant influent flow (I) the effect of changes in the recirculation ratio may be analyzed by making a simple algebraic transformation in the equations as outlined below:

$$Rr = \frac{\text{recirculation flow (Rf)}}{\text{influent flow (I)}}$$

$$\text{or } Rf = Rr I$$

$$Q = Rf + I = RrI + I = I(1 + Rr).$$

In Equations 5-12 and 5-13, the terms Rr and Q are in the form $(1 + Rr)^x Q^y$ which is seen to be equivalent to $(1 + Rr)^x I^y$ or $(1 + Rr)^{x+y} I^y$. With all variables with the exception of Rr held constant at the mean experimental levels, the three equations reduce to the following forms:

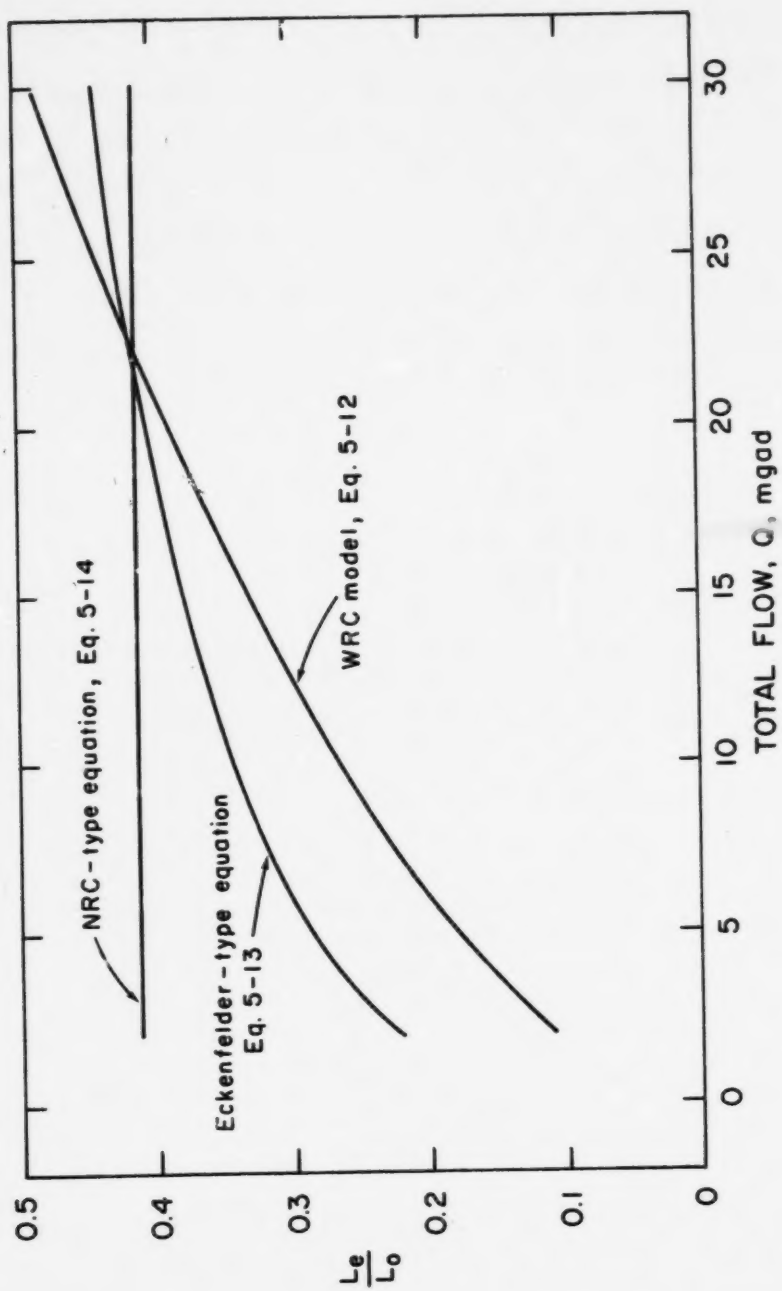


FIGURE 5-9. EFFECT OF TOTAL FLOW Q , ON FRACTION OF BOD REMAINING.

Equation 5-12, linear regression model --

$$Le/Lo = 0.483 (1 + Rr)^{-0.28}.$$

Equation 5-13, nonlinear regression model of the modified Eckenfelder-type equation --

$$Le/Lo = 1/[1 + 0.737 (1 + Rr)^{0.62}].$$

Equation 5-14, nonlinear regression model of the modified NRC equation --

$$Le/Lo = 1 - 1/[1 + 0.983 [(1 + Rr)/(1 + 0.1 Rr)^2]^{-0.44}].$$

The calculated effects on Le/Lo resulting from variations in recirculation ratio are shown in Table 5-6 and on Figure 5-10.

TABLE 5-6
EFFECTS OF RECIRCULATION RATIO ON FILTER-FINAL SETTLING
TANK PERFORMANCE

Rr	Le/Lo		
	Eq. 5-12	Eq. 5-13	Eq. 5-14
0.0	0.483	0.576	0.496
0.5	0.431	0.513	0.462
1.0	0.398	0.468	0.441
1.5	0.373	0.434	0.427
2.0	0.355	0.407	0.416
2.5	0.340	0.384	0.409
3.0	0.327	0.365	0.403
3.5	0.316	0.348	0.398
4.0	0.307	0.333	0.395
4.5	0.299	0.320	0.392
5.0	0.292	0.308	0.390

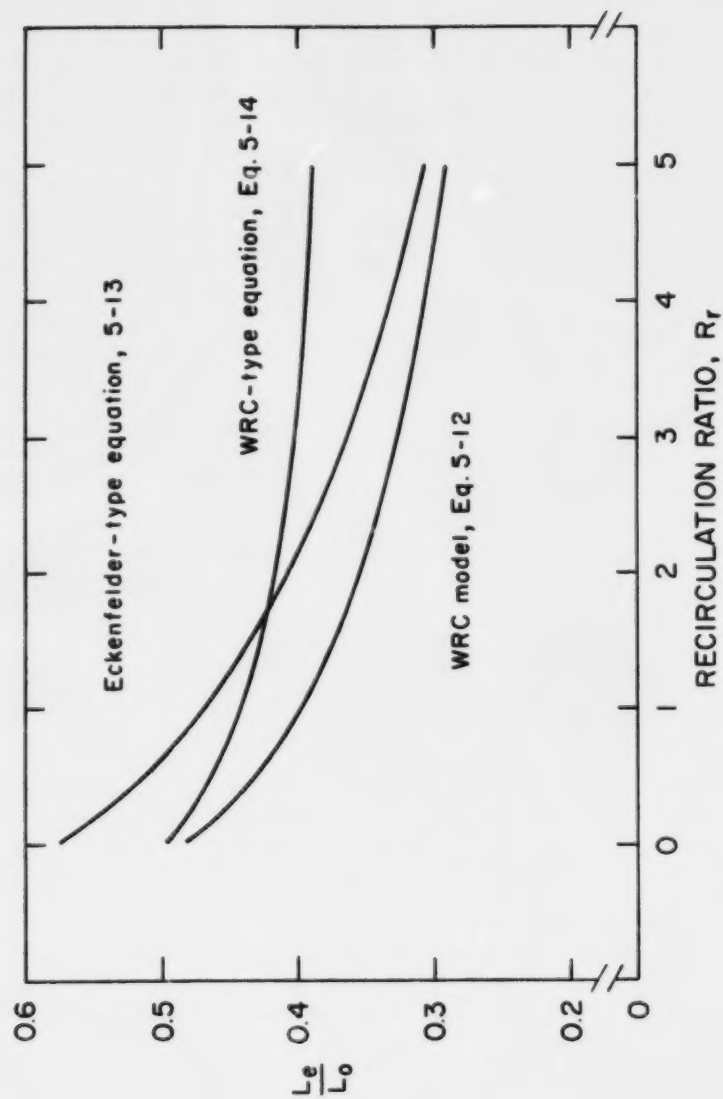


FIGURE 5-10. EFFECT OF RECIRCULATION RATIO ON FRACTION OF BOD REMAINING.

The beneficial effect of recirculation is clearly apparent in the above analysis. All models tested yield an improved removal with increasing recirculation ratios. Equation 5-13 produces the greatest increase in efficiency with increased recirculation. Equation 5-14 is the least sensitive. The unbiased linear regression model (Equation 5-12) more or less parallels Equation 5-13. These results indicate that fairly high recirculation ratios, i.e., at least equal to 3.0 and possibly higher, provide significant improvements in filter-final tank removal efficiency. This is true even though higher recirculation flows result in higher hydraulic loading, which considered alone, with recirculation ratios constant, tends to result in lower efficiencies.

G. PILOT PLANT STUDIES OF TWO-STAGE FILTRATION

1. Description of Pilot Trickling Filters

Two pilot trickling filter plants were constructed during 1966 prior to the initiation of the work reported here. Two additional trickling filter pilot plants were constructed during the course of this study. The plants were designed to treat raw Chapel Hill sewage which had passed through the main plant bar rack, a degritting chamber, and a fine bar rack to remove stringy solids which would tend to clog the small pumps and pipes in the pilot plant. Influent to the pilot plant was delivered through a 2-inch plastic pipe at a flow rate substantially in excess of pilot plant requirements. Excess flow was wasted. The required amount of pilot plant influent was delivered to the operating units by means of a variable speed pump with D.C. motors regulated by silicon controlled rectifiers. Flow to each of the pilot units was proportioned with the use of an overhead rotating distributor discharging into a circular distribution box with four equal radial sectors. Flow was by gravity from the distribution box to the primary settling tank of each pilot plant.

Each pilot plant unit consisted of a primary settling tank, a trickling filter, and a final settling tank. Recirculation was provided around the filters through the primary settling tank. A general flow diagram of a single pilot plant unit for single-stage filtration operation is shown in Figure 5-11.

The sizes of the settling tanks and filters were selected to provide detention time and, in the case of the filters, a hydraulic loading about the same as experienced in the main plant at a flow rate of 3 mgd. As the pilot settling tanks were not as deep as the main plant units, the surface overflow rate in the pilot units was substantially less than those in the main plant. All settling tanks were equipped for hydrostatic sludge removal.

The filters were designed to operate under conditions similar to those of the main plant filters. A filter diameter of four feet was selected, this being considered reasonably safe for minimizing wall effects. Conventional clay tile filter underdrains were used. Filter media depth

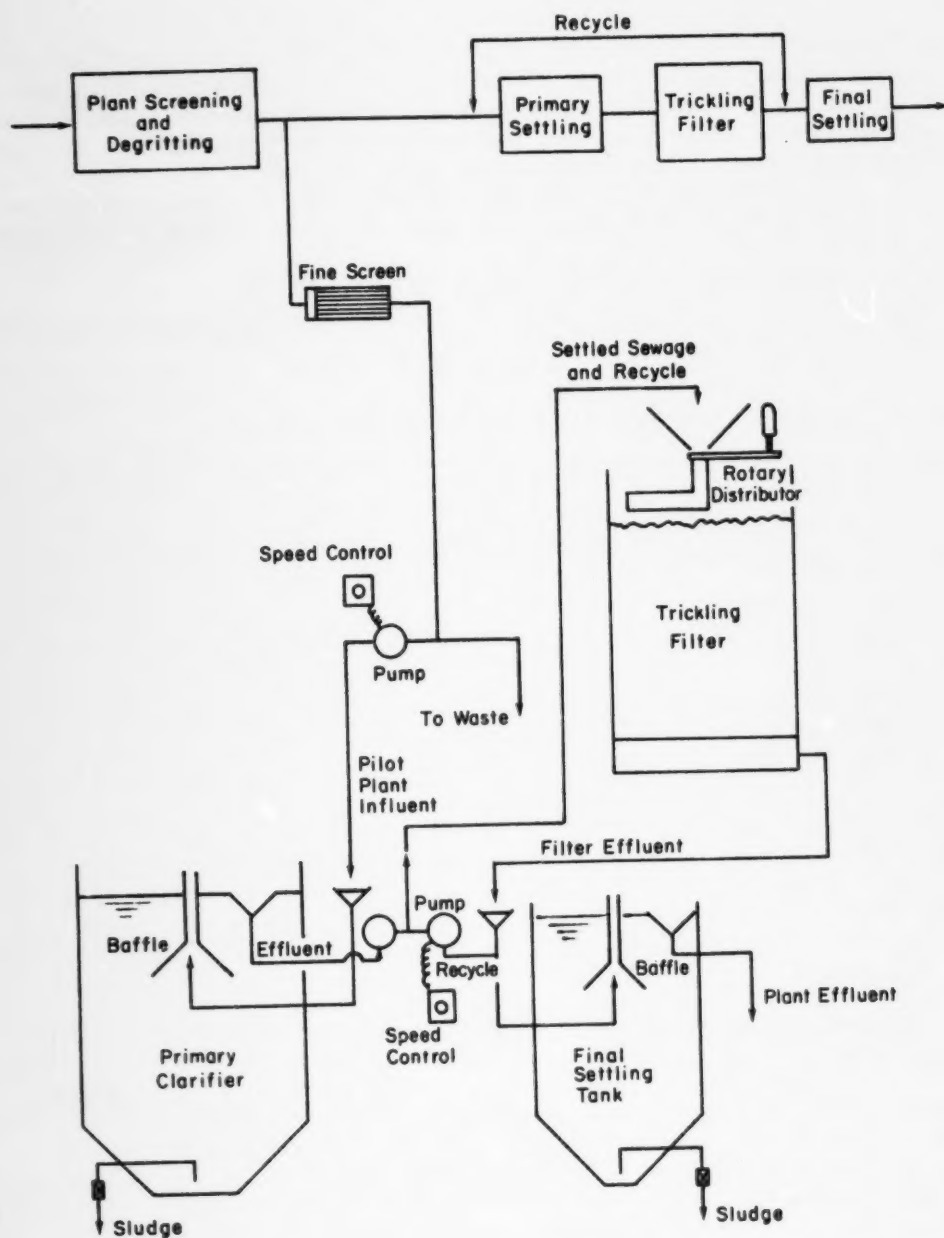


FIGURE 5-II. FLOW DIAGRAM OF PILOT TRICKLING FILTER FOR SINGLE STAGE FILTRATION.

was fixed at 4'0". Inner and outer walls of the filters consisted of two vertical concentric sections of Armco steel pipe, six feet long and 48 and 54 inches in diameter respectively. The annular space between the inner and outer pipes provided insulation to reduce heat loss during cold weather operation. Filter media was granite stone selected to meet the specifications of the N. C. stream pollution control authorities requiring that it pass a 3.5" screen with less than 75% passing a 2.5" screen.

Design conditions for the various plant units are given in Table 5-7 below:

TABLE 5-7
DESIGN CONDITIONS FOR PILOT TRICKLING FILTER UNITS

	Flow (gpm)	Detention Time (hrs)	Overflow Rate (gpd/ft ²)	Hydraulic Loading (mgad)
Primary Settling Tank	3.6	1.8	470	---
Filter	3.6	---	---	18.0
Final Settling Tank	1.2	2.0	436	---

On the basis of an influent BOD of 180 mg/l and 35% removal in the primary settling tanks, the organic loading on the filters calculates to be approximately 1500 lbs BOD per acre-foot per day.

Early in the experimental work with the trickling filter pilot plants all four pilot plant units were found to provide comparable performance under identical loading conditions.

2. A Comparison of Single- and Two-Stage Operation with Pilot Trickling Filters

Various authors and groups (4, 7, 8, 25, 26) have presented information suggesting that it is economical to utilize two-stage trickling filtration. Two-stage or series operation has been indicated to provide a higher degree of treatment than a single filter of equal volume. The substantiation of these claims for a typical domestic waste such as Chapel Hill's would have significant implication for the designer of any treatment plant in which more than one filter was necessary because of mechanical considerations or required by design or regulatory standards.

Because of the flow control problems in the Chapel Hill main plant, single-versus two-stage experiments were conducted in the pilot trickling filter units. The mode of operation was selected to be similar to that which would occur in the main plant if all influent flow was treated through one primary tank, then through one filter with recirculation through the primary. Effluent from the first stage filter would be passed through the secondary primary tank, which, in such case, would be acting as an intermediate settling tank. Wastewater would then pass through

the second stage filter with recirculation directly around the filter. Second stage filter effluent would pass through the secondary clarifiers prior to discharge.

Three of the pilot trickling filter units were operated as shown in the flow diagram in Figure 5-12 during the period from May 16, 1972 through July 13, 1972.

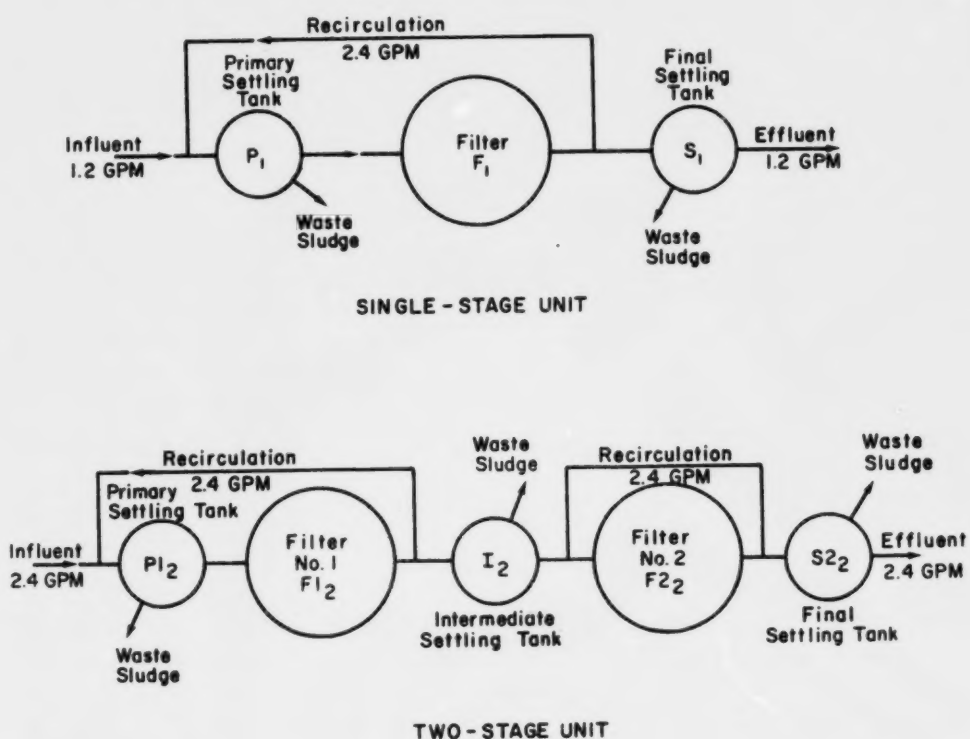


FIGURE 5-12. FLOW DIAGRAM OF SINGLE-STAGE AND TWO STAGE UNITS.

During the single-stage versus two-stage filtration experiments, the influent flow to the single-stage unit was held at 1.2 gpm and the recirculation flow was maintained at 2.4 gpm. Influent flow to the two-stage unit was set at 2.4 gpm. This is double the flow to the single-stage unit as the objective of the experiment was to estimate the effect of converting the Chapel Hill plant to two-stage operation in which case the entire plant influent would pass in sequence through the two filters rather than being split into equal portions for single-stage treatment through parallel units. Recirculation flow around each of the filters in the two-stage unit was held at 2.4 gpm, the same as in the single-stage unit. The decision to hold the recirculation flows to 2.4 gpm in the two-stage pilot unit was based on the fact that recirculation pumping capacity in the main plant is limited and if the main plant were converted to two-stage it seemed unlikely that the pumping capacity would be increased. With the recirculation flow as described the recirculation ratios were 2.0 in the single-stage pilot unit and 1.0 in the two-stage unit.

Hydraulic loadings or detention times of the various process units are tabulated below:

Single-Stage Unit (influent flow 1.2 gpm)			Two-Stage Unit (influent flow 2.4 gpm)		
Unit	Flow (gpm)	Detention Time or Loading	Unit	Flow (gpm)	Detention Time or Loading
Pri. Sett. Tank	3.6	1.8 hrs.	Pri. Sett. Tank	4.8	1.4 hrs.
Filter	3.6	18.0 mgad	Filter No. 1	4.8	23.9 mgad
Sec. Sett. Tank	1.2	2.0 hrs.	Int. Sett. Tank	2.4	1.0 hrs.
			Filter No. 2	4.8	23.9 mgad
			Sec. Sett. Tank	2.4	2.7 hrs.

These loadings and detention times correspond to normal values in full scale high rate trickling filter plants treating typical domestic sewage.

The organic loading on the filters was calculated on the basis of lbs of settled raw sewage BOD per day per acre-foot of filter volume. BOD removal in the primary settling tank unit was estimated to be 35 percent in the single-stage unit and 30 percent in the primary tank of the two-stage unit. Estimated average organic loading on the filters during the course of this experiment was as follows:

Single-Stage Filter	1500 lbs BOD/day/acre-feet*
First Filter in Two-Stage Unit	3200 lbs BOD/day/acre-feet*
Second Filter in Two-Stage Unit	1300 lbs BOD/day/acre-feet**

*settled raw sewage BOD

**intermediate settling tank effluent BOD

The organic loadings on all filters, both single- and two-stage, were within the range normally observed for high rate trickling filters treating domestic wastewater.

During the single- versus two-stage filtration investigation, samples were taken each half hour with a multitube sampling pump controlled by a timer. Samples were taken of influent and final effluent from the single-stage unit. Samples of influent, first stage effluent (intermediate settling tank effluent) and second stage effluent (final settling tank effluent) were obtained from the two-stage unit. Daily composite samples were obtained every Tuesday, Thursday, and Sunday during the experimental period. The daily sampling started at 8 a.m. and terminated at 8 a.m. the following morning at which time the accumulated samples were taken to the laboratory for analysis. During collection, the samples were accumulated in plastic jerry cans and stored at a temperature of 4° C. All samples were analyzed for suspended solids, organic carbon and BOD. A summary of the results of the investigation is shown in Table 5-8.

TABLE 5-8

SUMMARY RESULTS OF SINGLE- VERSUS TWO-STAGE TRICKLING FILTRATION

	Infl. (mg/l)	Two-Stage Filtration			Single-Stage Filtration	
		1st. Stage Eff. (mg/l)	Final Eff. (mg/l)	% Removal	Final Eff. (mg/l)	% Removal
Susp. Solids	247	32	18	92.7	36	85.3
Org. Carbon	156	44	26	83.4	41	73.7
BOD	179	51	23	87.2	36	79.8

These results indicate a clear advantage for two-stage filtration as compared with the more conventional single-stage process. As indicated in Table 5-9 in the following part of this section, the improved efficiency cannot be accounted for by the greater detention time in the final

settling tank in the two-stage unit. The economic advantage of two-stage filtration may be illustrated by way of an example based on the experimental results.

Using the mean BOD removals found for single-stage filtration and assuming a 35 percent removal of BOD in the primary settling tank, an appropriate constant may be determined for the NRC formula.

From the formula for the overall efficiency of two processes in series the required efficiency of the second stage process can be calculated if the overall and first stage efficiencies are known. From

$$E_{oa} = E_p + E_f (1 - E_p)$$

one obtains

$$E_f = E_{oa} - E_p / (1 - E_p) \quad (5-15)$$

in which

E_{oa} = overall efficiency

E_p = primary settling tank efficiency

E_f = filter-final settling tank efficiency.

Substituting the assumed value for E_p and the observed overall single-stage filtration efficiency for E_{oa}

$$E_f = 0.798 - 0.350 / (1 - 0.350) = 0.69 \text{ (69\%).}$$

If 69% is accepted for filter-final settling tank efficiency under loadings as maintained in the single-stage filtration pilot plant, a new constant term can be obtained for the NRC formula which will be in accord with the calculated efficiency.

From

$$E_f = 1 / [1 + C_1 (W/VF)^{0.5}]$$

with rearrangement one may obtain

$$C_1 = (1 - E_f) / [E_f (W/VF)^{0.5}].$$

The value of W/V from the single-stage experiments is 1500 lbs settled raw sewage BOD per day per acre-foot. The value of F for the recirculation ratio of 2.0 is 2.08. Therefore the calculated value of C_1 required for NRC formula agreement with observed results is

$$C_1 = 1 - 0.69 / 0.69 (1500/2.08)^{0.5} = 0.0167.$$

From the results of the experimental program it may be assumed that in a plant with two equal sized filters operating in parallel at loadings

equal to those in the pilot plant, overall BOD removal efficiency might be increased from 79.8% to 87.2% by converting to series operation without change in the size of the various units. On the other hand, if the same increase in efficiency is to be obtained by the addition of single-stage filters, the required increase in filter volume may be estimated using the NRC formula. The single-stage filter-final settling tank efficiency required for an overall efficiency of 87.2%, given that the primary tank removal is 35%, may be calculated using Equation 5-15 as follows:

$$E_f = (0.872 - 0.350)/(1 - 0.650) = 0.80 \text{ (80\%)}.$$

As the total lbs of raw settled BOD (W) applied to the filters has not changed, an estimate of the increased single-stage filter volume may be obtained by calculating a value for W/V which will provide the required removal and comparing this value with 1500 (the single-stage filter loading that resulted in an overall removal of 79.8%). To calculate the required value of W/V for 80% filter-final settling tank efficiency the NRC formula may be rearranged as follows:

$$W/V_2 = [(1 - E_f)(F)^{0.5}/E_f \cdot C_1]$$

and solving for W/V₂ for an 80% filter-final settling tank efficiency

$$W/V_2 = [(1 - 0.80)(2.08)^{0.5}/0.80 \cdot 0.0167]^2 = 445.$$

As W is a constant, i.e., the total lbs of settled raw BOD applied to the filter has not changed, it can be seen that for overall efficiency of 87.2%, $W = V_2 \times 445 = V \times 1500$. Therefore, $V_2 = V \cdot 1500/445$, i.e., the volume of single-stage filters required by the modified NRC formula for the desired improvement in removal is over three times the original.

The lack of reliability of the NRC formula and other mathematical models for predicting trickling filter performance has been demonstrated earlier. The use of any formula in calculations such as those above may be questioned. Regardless of formula deficiencies, the significant improvement which can be obtained in overall plant performance by operating trickling filters in series has been demonstrated in the pilot plant investigation. In most trickling filter treatment plants, at least two filters are provided. A design which provides for stage operation of the filters will add slightly to the initial plant cost, but the cost of adding additional single-stage filter volume to produce an equivalent efficiency will be substantially greater.

3. Rationale for Improved Efficiency in Two-Stage Filtration

The improved removal of BOD in two-stage filtration may result from the fact that as the hydraulic loading on a filter is increased the actual detention time of the wastewater in the filter does not proportionately decrease. If it is assumed that both laminar and turbulent flow conditions exist in the flow over filter, media it is not unreasonable to

assume that detention in the filter is roughly proportional to $D/Q^{0.5}$ (as implied in Eckenfelder's modification of Howland's equation). Table 5-9 was developed to illustrate the relative effect on filter detention time of variations in D and Q.

TABLE 5-9
RELATIVE DETENTION TIME IN FILTER

Q	$Q^{0.5}$	Relative Depth				
		4	8	12	16	20
1	1.00	4.00	8.00	12.0	16.0	20.0
2	1.41	2.84	5.68	8.51	11.3	14.2
3	1.73	2.31	4.52	6.94	9.25	11.5
4	2.00	2.00	4.00	6.00	8.00	10.0
8	2.83	1.41	2.83	4.25	5.66	7.07

As Table 5-9 shows, doubling the hydraulic loading does not halve the detention time. In the pilot plant experiments the hydraulic loading on the single-stage unit was 3.6 gpm which included 1.2 gpm of influent flow and 2.4 gpm of recirculation flow. Relative detention time in this unit can be calculated as $[4/(3.6)^{0.5}](1 + R_r)$, where $R_r = 2.0$. The result is 6.31. The term $(1 + R_r)$ must be included as the water actually passes through the filter an average of $(1 + R_r)$ times. In the two-stage pilot plant the hydraulic loading on each stage was 4.8 gpm which included 2.4 gpm of influent flow and 2.4 gpm of recirculation flow. The total depth of filter media in this case was 8 feet. The total relative detention time in the two-stage unit is $[8/(4.8)^{0.5}](1 + 1)$ or 7.29. If the recirculation ratio has been maintained at 2.0, as in the single-stage unit, the relative detention time in the two-stage unit would have been 8.43.

Increasing the specific surface area of filter media affects the time of liquid detention in a filter exactly the same as decreasing the hydraulic loading in the same proportion as the specific surface area is increased. For example, doubling the specific surface area while the areal hydraulic loading remains constant halves the actual liquid flow over each unit of media surface. With detention time the proportional to $1/Q^{0.5}$, detention time is increased by a factor of 1.41.

It can be seen that two-stage filtration with two filters of equal depth is comparable to filtration through one filter of twice the depth as the stage filters, i.e., the liquid detention time in the filter is doubled. In addition, increasing the specific surface area of the filter media is analogous to decreasing the hydraulic loading as it affects detention time. The overall effect on liquid detention time due to filter depth, recirculation ratio, and specific surface area of filter media is illustrated in the following, rather extreme examples:

Case 1. Influent flow 1 mgd; filter area 0.25 acres; filter depth 4 feet; no recirculation; relative specific surface area of filter media = 1. $Q = 1/0.25 = 4$ mgad.
Relative Detention Time = $D/Q^{0.5} = 4/4^{0.5} = 2.0$.

Case 2. Influent flow 1 mgd; filter area 0.05 acres; filter depth 20 feet; recirculation flow 1.2 mgd; relative specific surface area of filter media = 2.
 $Q = (1 + 1.2)/0.5 = 4.4$ mgad - this is the maximum hydraulic loading listed for high rate filters in WPCF Manual of Practice No. 8 (4).
Relative Detention Time = $D/(Q/2)^{0.5}(1 + R_r)$

$$= 20/(4.4/2)^{0.5}(1 + 1.2) = 9.37.$$

Factors other than liquid detention time can have significant effects on filter performance. Nevertheless, implications drawn from the two-stage pilot filter results and the detention time calculations above indicate the need to re-examine conventional design criteria which have led to shallow filters operated at relatively low hydraulic loadings and recirculation ratios.

H. ANALYSIS OF MAIN PLANT FINAL SETTLING TANK PERFORMANCE

At the Chapel Hill plant filter effluent contains a large fraction of suspended solids which are so finely divided that they do not settle well at the overflow rates or detention times typical for the secondary clarifier. In view of this, an analysis of secondary clarifier performance was conducted using data collected during various divisions of influent plant flow, i.e., from a 20-80% division to a 50-50% division. Final settling tank daily average detention times varied from approximately 1.3 hours to 6 hours and overflow rates from approximately 300 gpd/ft² to 1300 gpd/ft².

A total of 295 observations of trickling filter effluent and final settling tank effluent were analyzed and the following equations were obtained by regression analysis techniques:

For BOD removal:

$$\text{Final effluent BOD} = e^{0.84} (\text{TF} - \text{BOD})^{0.668} Q^{0.521} \quad (5-16)$$

For suspended solids removal:

$$\text{Final effluent SS} = e^{0.83} (\text{TF-BOD})^{0.668} Q^{0.521} \quad (5-16)$$

in which TF - BOD refers to filter effluent BOD; TF - SS, to filter effluent suspended solids.

Equation 5-16 had a multiple correlation coefficient of 0.85; Equation 5-17, of 0.84.

Plots of Equation 5-16 and 5-17 are presented in Figures 5-13 and 5-14 respectively.

The similarity of the equations for final effluent BOD and suspended solids implies that a single equation would be satisfactory for both parameters. Such equations are given below, one in terms of tank overflow rate and one in terms of detention time:

$$\text{Final eff. BOD or SS} = 0.092(\text{TF-BOD or SS})^{2/3} (Q_o)^{1/2} \quad (5-18)$$

in which Q_o = overflow rate in gpd/ft^2 and

$$\text{Final Eff. BOD or SS} = 3.9(\text{TF-BOD or SS})^{2/3} (D_t)^{-1/2} \quad (5-19)$$

in which D_t = final settling tank detention time in hours.

Table 5-10 below gives values of final effluent BOD and SS for various values of overflow rate and detention time corresponding to typical values of filter effluent BOD or suspended solids.

TABLE 5-10
CALCULATED VALUES OF FINAL EFFLUENT BOD OR SUSPENDED SOLIDS

D _t Detention Time (hrs.)	Q _o Overflow Rate (gpd/ft ²)	Values of F-BOD or Suspended Solids in mg/l							
		50	60	70	80	90	100	110	120
6.0	300	22	24	27	29	32	34	36	39
4.5	400	25	28	31	34	37	39	42	45
3.6	500	28	31	35	38	41	44	47	50
3.0	600	31	34	38	42	45	48	52	55
2.6	700	33	37	41	45	49	52	56	59
2.25	800	35	40	44	48	52	56	60	63
2.0	900	37	42	47	51	55	59	63	67
1.8	1000	40	44	49	54	58	62	67	71
	1100								
1.5	1200	43	49	54	59	64	86	73	77
1.4	1300	45	51	56	61	66	71	76	80
1.3	1400	47	53	58	64	69	74	79	83

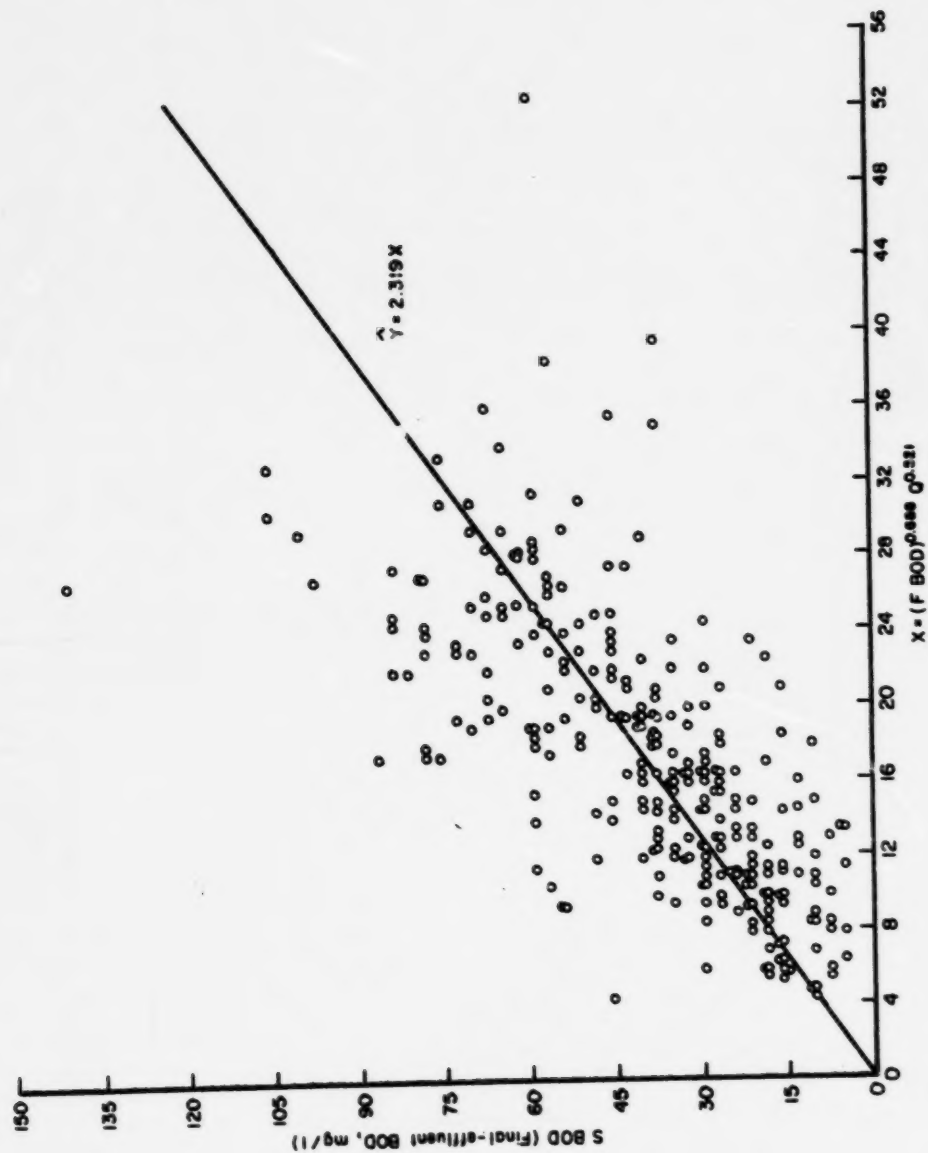


FIGURE 5-13. PLOT OF THE REGRESSION EQUATION FOR BOD IN THE FINAL CLARIFIER

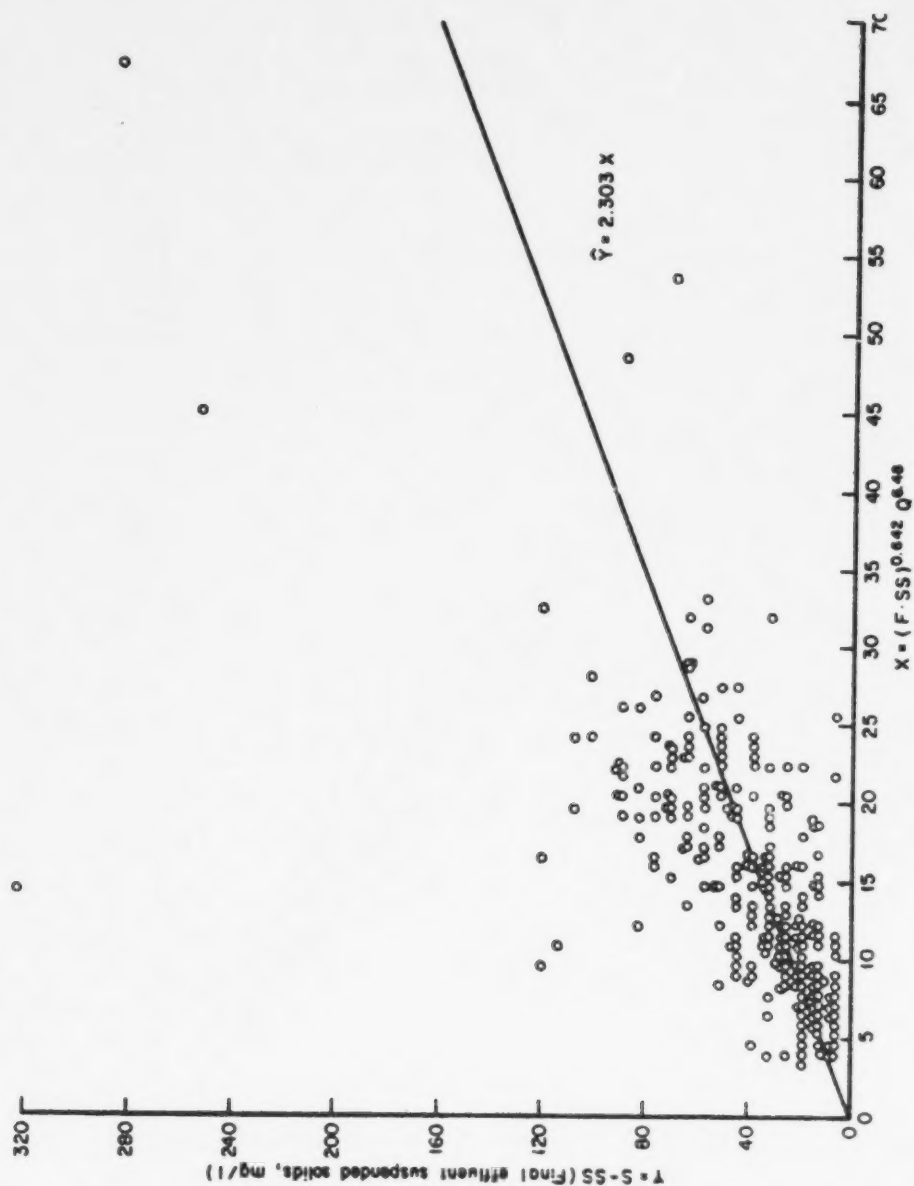


FIGURE 5-14. LOT OF THE REGRESSION EQUATION FOR SUSPENDED SOLIDS IN THE FINAL CLARIFIER.

Using the results in Table 5-10 and cost information for various sized settling tanks it is possible to make some interesting estimates. For example, if, for a plant of 1 mgd and influent BOD of 200 mg/l, the filter effluent has a BOD of 70 mg/l, the predicted final effluent BOD for a settling tank overflow rate of 1000 gpd/ft² would be 49 mg/l. Overall plant removal would be 75.5%. Based on cost information supplied by Black & Veatch (5) the 1971 construction cost of a single final settling tank would be about \$42,000. If the surface area of the final settling tank were doubled the overflow rate would be 500 gpd/ft² and the predicted final BOD would be 35 mg/l for an overall plant removal of 82.4%. The 1971 construction cost of the larger final settling tank, again based on Black & Veatch, would be about \$55,000. The incremental cost of \$13,000 is quite reasonable for the projected increase in efficiency. The cost of achieving a similar improvement by adding to other units in a trickling filter plant, i.e., the primary settling tank, the filter, or the recirculation capacity, would be substantially greater.

I. CONCLUSIONS REGARDING OPERATION OF EXISTING TRICKLING FILTER PLANTS

Often there is little that can be done to improve the operation of an existing trickling filter plant unless the plant is not being operated properly. Occasionally, however, plants are designed with sufficient flexibility to allow modifications in operating procedures which can improve treatment results.

Recirculation - Some plants may be provided with ample recirculation capacity, but fail to utilize it. As indicated in Figure 5-10 recirculation ratios up to 3.0 can add significantly to plant performance. High recirculation ratio and consequent high hydraulic loadings also help control the growth of psychoda flies during warm weather. On the other hand, low recirculation ratios may impair operating efficiency and result in conditions favorable to the prolific growth of psychoda flies with attendant nuisance conditions.

At a few plants recirculation flow is drawn from a point downstream of the final settling tanks. This means that both influent base flow and recirculation flow passes through the final tank. In such cases the tank must be designed to handle the higher resulting hydraulic loadings and, consequently, may be quite large. If the point of recirculation suction is changed to a location ahead of the final tank there will be little or no effect on the performance of the trickling filter as a unit, but the performance of the final tank will be significantly improved at the lower hydraulic loading. For example, if the final tank hydraulic loading was 800 gpd/ft² with recirculation flow through the tank at a recirculation ratio of 1.0, predicted final effluent BOD and SS according to Table 5-10 would be 48 mg/l if the filter effluent BOD and SS were 80 mg/l. Taking recirculation flow ahead of final tank would reduce the hydraulic loading to 400 gpd/ft² and predicted final effluent BOD or SS would be 34 mg/l - a substantial improvement in performance.

Experiments were conducted during this investigation as to the effect of the point of recirculation return, i.e., ahead of the primary settling tank or directly ahead of the filter. Recirculation through the primary tank showed a very slight advantage. If the primary tank is overloaded, e.g., a detention time of one hour or less with recirculation flow passing through the tank, there may be some advantage in direct recirculation. However, the advantage of direct recirculation, under such condition, has not been verified during this study. If prechlorination is not possible, recirculation of filter effluent through the primary tank freshens stale influent sewage and helps prevent odors.

Two-Stage Filtration - If a trickling filter plant has been designed to permit either single- or two-stage operation of the filters, the two-stage method should be used to the greatest extent possible. As has been indicated in this investigation, two-stage operation will result in

significant improvement in plant performance as compared with single-stage filtration.

Supernatant Return - The quality of anaerobic digester supernatant and its method of return to the plant flow units can have a significant effect on plant performance. Intermittent, high rate, return of supernatant from a mixed digester will have a very deleterious effect on plant performance and on the appearance of the final effluent. On the other hand, the continuous return of supernatant from an unmixed secondary digester during periods of low plant flow, e.g., during the night, will have little effect on plant performance. For these reasons, when two or more digesters are available, one unit should be used as a secondary to provide conditions for separation of sludge and supernatant. The secondary unit should not be mixed or heated unless the heating system does not contribute to tank turbulence. Supernatant should be returned to the head end of the plant.

J. CONCLUSIONS REGARDING PLANT UPGRADING WITH MINOR ADDITIONS

Recirculation - If no provision for recirculation has been made in the original design, its addition at a later date may be difficult. On the other hand, the addition of a recirculation well with vertical shaft pumps may be possible. As has been shown, recirculation will have a beneficial effect on plant performance.

Frequently the recirculation capacity provided in original design does not permit operation at recirculation ratios much above 1.0. In such cases consideration should be given to increasing recirculation capacity. It is often possible to substantially increase recirculation flow by increasing pump impeller diameter and motor horsepower.

In cases where recirculation is added or increased it will be necessary to carefully check the hydraulic capacity of the various units which will be affected. Particular attention should be given to the capacity of the filter distributor and underdrainage system. Distributor capacity can often be increased by increasing the size of the distribution orifices, provided the distribution arms can carry the extra flow without too high a water level in the central column. The underdrainage system must have sufficient capacity to carry the extra flow without impairing filter ventilation.

Two-Stage Filtration - Often two or more filters exist at a plant but no provision exists for two-stage operation. In such cases, two-stage operation will result in improved performance provided the units have hydraulic capacity to handle the flow. For example, conversion to two-stage operation at Chapel Hill will result in a 33 percent increase in flow through the filters provided the recirculation flow is not increased. In all cases plant hydraulics must be carefully analyzed before attempting any modification to provide two-stage operation. If hydraulic problems are encountered the expedient remedy may be to reduce recirculation flow. When an existing plant is designed for single-stage

operation only, it will be necessary to alter some structures, piping and valving to channel the effluent from the first stage units to the second stage units. A flow control system to equalize flow from first to second stage units with plant influent flow must also be provided.

Final Settling Tanks - As indicated in Part H, additional final settling tank capacity will significantly improve overall plant efficiency for relatively minor capital costs.

K. CONCLUSIONS AS TO THE DESIGN OF MAJOR ADDITIONS OR NEW PLANTS

In the selection of a biological treatment process for a new facility a number of cost and operating factors must be considered. If removal of 80 or 85 percent of BOD and suspended solids, during summer months, will meet requirements, the normal single-stage high rate trickling filter process, designed at conventional loadings, is an attractive alternative. Operating costs are relatively low, the system recovers quickly from shock loads and operation is fairly simple. On the other hand, if 90 percent or more removal is required, the activated sludge process is commonly selected. Although this process is more easily upset and requires a higher level of operating skill, it will provide 90 percent or greater efficiency when operating properly.

Smith (27) has reported the total annual cost of various types of treatment plants. Some of these data, adjusted to an ENR Cost Index of 1600, are tabulated below:

TABLE 5-11

COSTS OF TRICKLING FILTRATION AND ACTIVATED SLUDGE PLANTS ADJUSTED
TO ENR CONSTRUCTION COST INDEX OF 1600

Total Annual Cost - ¢/1000 Gallons

<u>Capacity (mgd)</u>	<u>Trickling Filtration</u>	<u>Activated Sludge</u>
1	22.8	28.9
5	15.2	19.8
10	12.6	16.8
20	10.6	14.0
100	8.5	9.7

Obviously, the trickling filter process has the economic advantage, particularly for small and medium sized plants. If the efficiency of the trickling filtration process could be upgraded to compare with that of activated sludge, it would be a very attractive alternative in many situations.

Frequently, the design engineer faces the problem of obtaining a plant efficiency of 90 percent or more where a trickling filter plant is al-

ready in existence. As illustrated in the following example, he might consider the construction of additional plant units, similar to those in existence.

Given: A high rate trickling filter plant with an influent flow of 1 mgd and BOD of 166 mg/l, in which the primary tank removes 35 percent of the BOD and the filters and the final tank removes 69 percent of the remaining BOD for an overall plant removal of 80 percent at a temperature of 22° C. The filter has an area of 0.25 acres and a depth of 4 feet. The recirculation ratio is 2.5. (Filter efficiency is based on Equation 5-12).

Required: An overall plant removal of 90 percent.

Solution: Assume the settling tanks are not overloaded and that required efficiency is to be obtained by providing additional filters.

The required efficiency of the filters and final settling tanks must be 85% for an overall plant efficiency of 90%.

$$[E_{oa} = 1 - (1-E_1)(1-E_2); 0.90 = 1 - (1-0.35)(1-0.85) = 0.90].$$

Equation 5-12 may be rearranged to solve for filter volume as follows:

$$Le/Lo = 9.84 (W/V)^{-0.14} T^{-0.95} (1+Rr)^{-0.28} (I_f/V/D)^{0.56}$$

in which W = lbs. settled raw BOD/day

V = filter volume (acre-feet)

I_f = settled sewage influent flow (mgd).

Solving for V

$$V = [(Lo/Le) 9.84 W^{-0.14} T^{-0.95} (1+Rr)^{-0.28} I_f^{0.56} D^{0.56}]^{2.38}.$$

Under the given conditions,

$$V = [(Lo/Le) 0.309]^{2.38}$$

and for a filter-final tank efficiency of 85% the required filter volume is 5.59 acre-feet.

The cost of the original filter volume (1.0 acre-feet) estimated from Black & Veatch data (5) adjusted to an EPA Wastewater Treatment Plant Construction Cost Index of 173 is \$160,000. For an additional filter volume of 4.59 acre-feet, the added cost will be 4.59 x \$160,000 or

\$734,000. Attendant recirculation facilities for the new filters will add another say, \$250,000, for a total additional initial cost of \$984,000. Ammortizing these costs over 25 years at 6% interest plus an additional \$20,000 per year for operation gives a total annual cost attributable to the new filters of

$$\$984,000 \times 0.0782 + \$20,000 = \$97,000/\text{year}.$$

If a second filter of the same size of the original filter is added, as a second stage unit and its relative efficiency, compared with the first stage filter, is the same as found in the pilot plant experiments reported previously (i.e., the second stage pilot filter was 93% as efficient as the first stage unit in terms of BOD), the overall plant efficiency would be,

$$E_{0a} = 1 - (1-0.35)(1-0.69)[1-(0.93)(0.69)] = 0.928, (92.8\%).$$

In this case the additional cost for one filter is \$160,000 plus say, \$60,000 for recirculation and \$5,000 per year for additional operating costs. The total annual cost over 25 years at 6% interest would be,

$$\$220,000 \times 0.0782 + \$5,000 = \$22,000/\text{year}.$$

Obviously two-stage filtration provides a more economical alternative. The estimated removal for the two-stage system may be optimistic, however, if additional final settling tank capacity were added it seems safe to say that the reliable average BOD removal efficiency would be at least 90 percent.

Chemical treatment of filter effluent at Chapel Hill described in another report (*), indicates that over 90 percent of BOD, SS and phosphorus can be removed with alum dosages of about 175 mg/l. Allowing \$55 per ton for alum, \$100,000 for the initial cost of chemical storage, handling and feeding equipment, \$150,000 for sludge disposal facilities, \$100,000 for additional final settling tanks, and \$10,000 per year for other additional operating costs, the total annual cost per mgd is estimated to be \$50,000.

The relations developed to predict final settling tank performance (Equations 5-18 and 5-19) clearly indicate the benefits of designing for lower surface loadings. Although these equations are only valid for final tanks following single-stage filtration it is reasonable to suppose that low surface loadings would provide similar improvements following two-stage filtration. When chemical precipitation using aluminum or iron salt for phosphorus removal is required, or likely to be required in the future, low surface loadings will significantly improve overall results. Performance applying liquid alum to final settling tank influent at Chapel Hill was greatly enhanced when final tank sur-

*EPA Report on Phosphorus Removal Studies at Chapel Hill Plant

face loadings were reduced to values less than 600 gpd/ft². Based on the probability that many plants will be required to remove phosphorus, coupled with the observed improvement in plant performance at low final tank loading with or without chemical treatment, it is recommended that design criteria for new or additional final settling tanks for trickling filter plants be based on a surface loading of 500 gpd/ft². Since chemical treatment will be required at many plants it is suggested that structures be provided to facilitate the addition of rapid mixing and flocculation. Flocculation might be provided in a separate structure or as an integral part of the final settling tank.

In summary, new or enlarged trickling filter plants should be provided with the following features:

1. Two-stage operation of filters with provision for interchanging the lead and secondary filters.
2. Sufficient recirculation pumping capacity to provide a recirculation ratio of 3.0 around both first and second stage filters.
3. Final settling tank surface loadings of 500 gpd/ft².
4. Provision should be made for the possible future addition of coagulants such as iron and aluminum salts. In this regard, structures designed to facilitate the addition of rapid mixing and flocculation should be incorporated in the design.

Trickling filter plants designed to the general criteria suggested above should provide a very acceptable alternative to activated sludge. Performance will be comparable. Total annual cost will be lower while the traditional advantage of the trickling filter process, i.e., simplicity of operation and ability to withstand shock loads without long term process upset, will be maintained.

The further development of rational theory for trickling filter performance offers distinct possibilities for improvements in process efficiency and economy. In the section of this chapter describing two-stage filtration with pilot filters it was implied that current theory, if substantiated, could lead to the development of deep filters, packed with a media of high specific surface area combined with non-clogging properties, operated at high hydraulic loadings and high recirculation. This type of development might lead to the continuous dosage of wastewater to the surface of the filter with the elimination of costly rotary distributors.

SECTION VI

ACTIVATED SLUDGE STUDIES

The high-rate trickling filter wastewater treatment plant is generally incapable of routinely meeting standards of 90% removal of BOD and suspended solids. The filter effluent contains suspended solids which resist settling and which are removed to only a slight extent in the secondary clarifier. Since nitrification is rarely achieved in high-rate filter plants, the effluent from such a plant is characterized by a high ammonia content (25-35 mg/l NH_4^+-N) which exerts an oxygen demand in the receiving stream.

On the other hand, activated sludge treatment is generally capable of 90% removals of BOD and suspended solids. With appropriate control of dissolved oxygen, loading, and detention time, activated sludge systems can be modified to achieve high degrees of nitrification in relatively short detention times.

Based on such considerations, it would appear that further treatment of trickling filter effluent by short-term activated sludge treatment could enhance the quality of the final effluent.

Hagerich (28), Vosloo and Finsen (29), Hansen *et al.* (30), and the City of San Buenaventura (31) have reported that activated sludge units have been used to treat trickling filter effluent. Hagerich (28) reported overall 96.5% reductions in suspended solids and 96.6% reductions in BOD. He did not report the detention time of the aeration units although the indication is that it was relatively short. Hansen *et al.* (30) report BOD removals of 82% and suspended solids removals of 76%. These removals seemed to be adversely affected by solids carryover and storm water infiltration and wash-out. None of the previous investigations systematically evaluated the most effective design parameters of optimum activated sludge treatment of trickling filter effluent. The purpose of the present investigation was to evaluate the utility, design, operation, and characteristics of activated sludge treatment of trickling filter effluent.

A. 0.1 GPM ACTIVATED SLUDGE PILOT PLANTS

1. Design and Operation

Five tertiary activated sludge pilot plants (ASPP) each consisting of an aeration tank and settling tank with air lift sludge return were constructed as shown in Figure 6-1. Design parameters are given in Table 6-1. The hydraulic detention time varied from 0.4 hr in Unit 1 to 9.2 hr in Unit 5, and the volume under aeration varied from 7 l in Unit 1 to 165 l in Unit 5. The influent to the ASPP was effluent from one of the Chapel Hill trickling filters. This was channeled into a flow split-

ter and fed at 300 mL/min to each unit. The five settling tanks were of identical design; thus, the overflow rates and detention times were identical for each unit. Aeration was provided at such a rate as to maintain the dissolved oxygen in the aerator above 1.5 mg/L. Sludge was returned to the aeration unit at a rate of 1000 mL/min, and temperature was controlled at 25° C in the aeration units.

Since the main plant trickling filters were also being manipulated experimentally by altering the organic and hydraulic loading, the quality of the influent to the ASPP varied not only with the traditional season and raw sewage flow but also with the main plant experimental design. The experimental program of the ASPP was designed to evaluate the effect of detention time, sludge wasting, pH control, and influent loading on overall performance (Table 6-2). Sludge was wasted by withdrawing equal portions of the mixed liquor three times a day. During periods of pH control, NaHCO₃ was metered into the influent stream in such quantities that influent alkalinity was increased by about 40 mg/L as CaCO₃. This program was initiated due to the sharp decrease of pH in units exhibiting nitrification. This will be discussed in a subsequent section. It was anticipated that the small settling tanks would not provide efficient solids removal. To establish the performance of the units with complete solids removal as well as evaluate the contribution of solids to the various quality parameters, all samples were analyzed both uncentrifuged and centrifuged (10 min @ 2200Xg, International Model UV Centrifuge).

Two-day composite samples were collected automatically three times per week by pumping equal volumes from the influent line and the overflow from each settling tank every 30 min into sample containers stored at 3-5° C. They were analyzed for uncentrifuged and centrifuged suspended solids, volatile solids, total organic carbon, chemical oxygen demand (COD), biochemical oxygen demand (BOD), methylene blue active substances (MBAS), and all forms of nitrogen and phosphorus. Mixed liquor grab samples were analyzed for mixed liquor suspended solids (MLSS) and mixed liquor volatile suspended solids (MLVSS). Grab samples of the influent and effluents from the units were analyzed daily for turbidity and pH. Dissolved oxygen, influent flow rate, temperature, return flow rate, and settleable mixed liquor solids were determined daily.

Figure 6-2 is a photograph of the units in operation.

2. BOD Removal

As mentioned earlier, it was anticipated that the small settling tanks would not provide optimum solids removal. Heavy blankets of sludge did develop but channeling problems prevented return of this heavy sludge with the air lift sludge return. While sludge was returned, the concentration was not as great as that which remained in the settling tanks. Thus, large quantities of solids remained in the settling tanks. This accumulation was greatest in the settling tank of Unit 1 and least in Unit 5. During periods of active nitrification in the aeration units

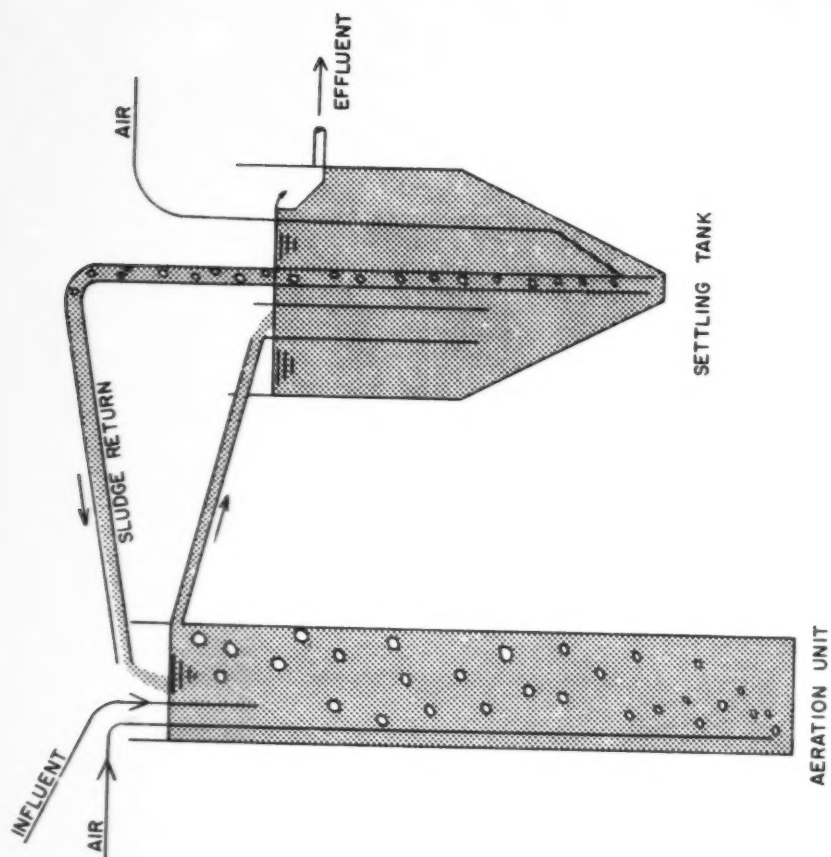


FIGURE 6-1. DIAGRAM OF AERATION UNIT AND SETTLING TANK OF ACTIVATED SLUDGE PILOT PLANT.

TABLE 6-1

DESIGN PARAMETERS

	<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>	<u>Unit 4</u>	<u>Unit 5</u>
Influent Flow (mL/min)	300	300	300	300	300
Aerator Volume (liters)	7.0	17.1	30.0	73.3	165.0
Detention Time (hours)	0.39	0.95	1.67	4.07	9.17
Return Sludge (mL/min)	1000	1000	1000	1000	1000
Temperature °C	25	25	25	25	25

TABLE 6-2

CHARACTERISTICS OF EXPERIMENTAL PERIODS

Exp. Period	Dates	pH Control	Avg. Inf BOD ₅ *	Sludge Wasting (l/day)				
				Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
I	2/16-3/12/70	No	60	0	0	0	0	0
II	3/13-4/14/70	Yes	60	0	0	0	0	0
III	5/1-6/2/70	Yes	72	0.35	1.1	2.2	2.2	2.2
IV	6/15-7/24/70	Yes	31	1.4	4.4	8.8	8.8	8.8
V	8/3-9/3/70	Yes	20	3	9	18	18	18
VI	9/9-10/25/70	Yes	35	0	0	0	0	0
VII	11/3-12/1/70	No	36	0	0	0	0	0
VIII	12/2/70-1/10/71	No	68	0	0	0	0	0

* mg/l

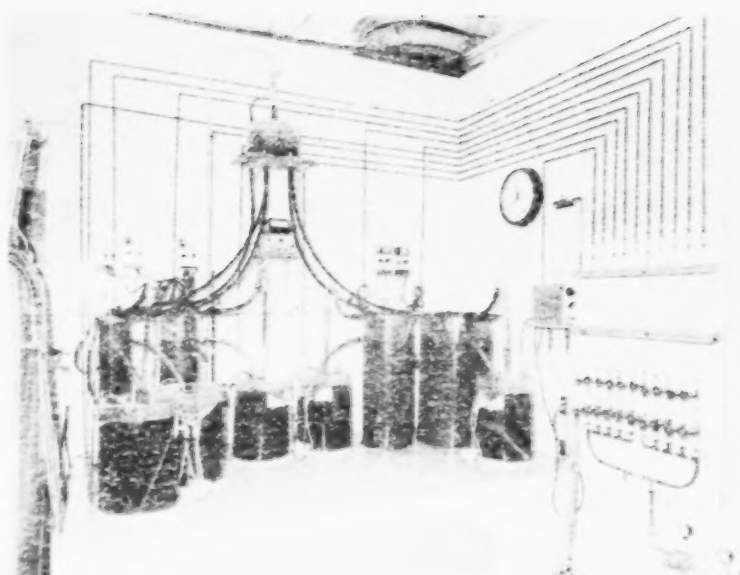


FIGURE 6-2. PHOTOGRAPH OF THE FIVE ACTIVATED
SLUDGE PILOT PLANTS.

and active denitrification with consequent release of nitrogen gas in the settling tanks, sludge floated to the surface and was carried into the effluent stream. Thus, the effluent often had a high solids concentration.

Practical activated sludge treatment, of course, requires that the sludge be readily settleable for return to the aeration unit or wasting. Table 6-3 shows the average sludge volume index (SVI) and mixed liquor suspended solids (MLSS) in the five ASPP during the eight experimental periods. Note that, except for period VIII when the system was full of solids due to the long period of no wasting, the SVI was within the acceptable limits of a "good" activated sludge (50-100). This suggests that, with settling tanks more hydrodynamically similar to full scale installation, substantial solids removal by sedimentation might occur.

Mixed liquor suspended solids, in general, decreased with increased detention time, but the total mass of solids increased with detention time due to the size of the units. Since all units were fed at the same rate, loading was highest at the lower detention times. MLSS was generally highest during periods of highest BOD loading and decreased with wasting during periods III, IV, and V. The values increased markedly during period VI following the period of high wasting. During period VIII, high BOD loading and very heavy solids accumulation in the settling tank changed the character of the sludge with resultant bulking and lower than expected MLSS.

The above data regarding SVI and MLSS indicate that an activated sludge process can be maintained with trickling filter effluent as feed. Having established that such a unit will operate, it remains to establish the treatment capability and size of such a unit process.

Table 6-4 presents the average BOD at various points in the full scale trickling filter treatment process and of the effluents from the ASPP. Since the samples included solids, high average BOD values were recorded in the effluents of the ASPP when there was substantial solids carry over. The BOD values of the main plant final settling tank effluent are little different from those of the ASPP influent (trickling filter effluent); therefore, the main plant final settling tank provided little BOD removal. Effluent BOD's from the ASPP generally decreased with increased detention time and were substantially lower than influent in all units for all periods except for Unit 1 in period II. Thus, even with far from optimum sedimentation, sludge return, and sludge wasting, the effluent BOD from these tertiary activated sludge units was substantially lower than normal effluent BOD from the trickling filter plant.

Since it was felt that a full scale activated sludge process would have substantially lower effluent solids, centrifuged as well as uncentrifuged samples were analyzed. Table 6-5 lists the uncentrifuged raw influent BOD, uncentrifuged and centrifuged values of trickling filter effluent BOD, and the centrifuged BOD of the ASPP effluents. Having

TABLE 6-3

AVERAGE SLUDGE VOLUME INDEX (SVI) AND MIXED LIQUOR SUSPENDED SOLIDS (MLSS*)
OF ACTIVATED SLUDGE PILOT PLANTS RECEIVING TRICKLING FILTER EFFLUENT

Exp. Period	Unit 1		Unit 2		Unit 3		Unit 4		Unit 5	
	SVI	MLSS x10 ³	SVI	MLSS x10 ³	SVI	MLSS x10 ³	SVI	MLSS x10 ³	SVI	MLSS x10 ³
I	80	11.6	118	5.9	45	2.0	38	2.0	33	2.0
II	76	12.6	63	3.2	62	1.8	57	2.0	38	2.2
III	89	10.8	93	2.6	56	1.9	64	2.3	46	1.8
IV	96	4.3	71	1.5	68	1.1	38	0.26	55	0.92
V	89	0.20	32	0.30	32	0.07	32	0.13	20	0.26
VI	65	6.5	61	6.7	66	4.3	64	2.4	61	1.6
VII	60	4.5	70	3.5	45	2.8	43	1.5	21	1.8
VIII	103	8.2	153	4.1	178	1.8	231	1.2	52	0.9

* mg/l

TABLE 6-4

AVERAGE BOD AT VARIOUS POINTS IN TREATMENT PROCESSES INVOLVING A PRIMARY TANK AND TRICKLING FILTER IN SERIES WITH EITHER A FINAL SETTLING TANK (FST) OR ACTIVATED SLUDGE PILOT PLANT (ASPP)

Exp. Period	Raw Influent BOD ₅ **	FST Effluent BOD ₅ **	ASPP Inf BOD ₅ **	ASPP Effluent BOD ₅				
				Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
I	176	56	60	41*	29	27	20	22
II	165	53	60	57*	36	25	14	14
III	147	50	72	49*	49*	44	33	8
IV	144	26	31	19	21	12	12	7
V	172	25	20	14	13	10	12	9
VI	133	42	35	20	17	12	8	7
VII	150	54	36	21	12	12	9	7
VIII	132	65	68	18*	41*	29*	31*	8

*Very high solids in effluent

**mg/l

TABLE 6-5

AVERAGE BOD AT VARIOUS POINTS IN A TREATMENT PROCESS INVOLVING A PRIMARY TANK AND TRICKLING FILTER IN SERIES WITH AN ACTIVATED SLUDGE PILOT PLANT AND SUBSEQUENT REMOVAL OF SOLIDS

Exp. Period	Raw Influent BODs*	Filter Effluent BODs*		ASPP Effluent BODs*, Centrifuged				
		Uncentrifuged	Centrifuged	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
I	176	60	33	8	8	9	4	4
II	165	60	21	7	8	5	3	3
III	147	72	14	10	9	5	3	3
IV	144	31	13	5	3	4	5	3
V	172	20	8	11	6	7	6	5
VI	133	35	17	5	4	4	3	2
VII	150	36	12	5	4	3	2	2
VIII	132	68	34	9	7	5	3	2

*mg/l

already established that the final tank accomplishes very little BOD removal, the uncentrifuged and centrifuged values of filter effluent BOD give an approximation of the effect of complete solids removal on the quality of the final main plant effluent. Complete solids removal by filtration, coagulation, or some other process would indeed improve effluent BOD markedly. However, passing trickling filter effluent through the ASPP and removing solids from the effluent decreased BOD to very low levels. Notice that even with less than 2 hrs. detention (Units 1, 2, and 3) the effluent BOD was within quite acceptable limits. Longer detention time resulted in effluent BOD values which are similar to those of natural fresh water in the Piedmont area of North Carolina. While there was substantial variation in values from unit to unit and period to period with uncentrifuged samples, there was much less variation with centrifuged samples. This, of course, indicates that consistent performance depends in large part on effective solids removal.

Table 6-6 presents the average per cent removal of BOD from trickling filter effluent within the ASPP. Removal generally increased with detention time and generally decreased during the period of high wasting. Since these removals are based on uncentrifuged samples, they are generally lower during periods when the effluent was high in solids. Also, since the values in this table are from uncentrifuged samples, these probably indicate the lowest performance expected by activated sludge treatment of trickling filter effluent. All are, of course, better than the removal provided by the conventional final settling tank in the main plant.

Table 6-7 presents the average removal of BOD within the various ASPP units with subsequent centrifugation of the effluents to remove solids. Removals were much greater with centrifugation, as shown in the previous table. These results, then, represent the highest performance to be expected within the activated sludge units of various detention times treating trickling filter effluent. The variation in performance at various detention times with complete solids removal was much less than without solids removal. This would again indicate that effective solids management would allow substantial BOD removal even at the 0.4 hr. detention time.

One of the implicit purposes of any addition to the treatment flow sheet of the trickling filter process is to increase overall BOD removals to greater than 90%. Figure 6-3 shows the BOD removal by the main plant during the eight experimental periods and the additional removal by activated sludge treatment of trickling filter effluent. These values are calculated on the basis of uncentrifuged samples. With this lowest performance measurement, there is generally substantial improvement even with the short detention time units while the higher detention units generally provided approximately 90% overall BOD removal.

Figure 6-4 shows the overall BOD removal in the main plant and the additional removal by the activated sludge units followed by solids removal.

TABLE 6-6

AVERAGE PER CENT BOD REMOVAL IN ACTIVATED SLUDGE PILOT UNITS
BASED ON UNCENTRIFUGED SAMPLES

Exp. Period	Avg. Inf. BOD, mg/l	% BOD Removal*				
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
I	60	32**	52	55	67	63
II	60	5**	40	59	77	77
III	72	32**	32**	39	54	89
IV	31	39	33	62	62	78
V	20	26	32	47	42	55
VI	35	48	53	67	77	79
VII	36	43	67	67	74	80
VIII	68	76**	40**	57**	54**	88

$$*\% \text{ BOD Removal} = \left[1 - \left(\frac{\text{Effluent BOD, Uncentrifuged}}{\text{Influent BOD, Uncentrifuged}} \right) \right] \times 100$$

**Very high solids in effluent

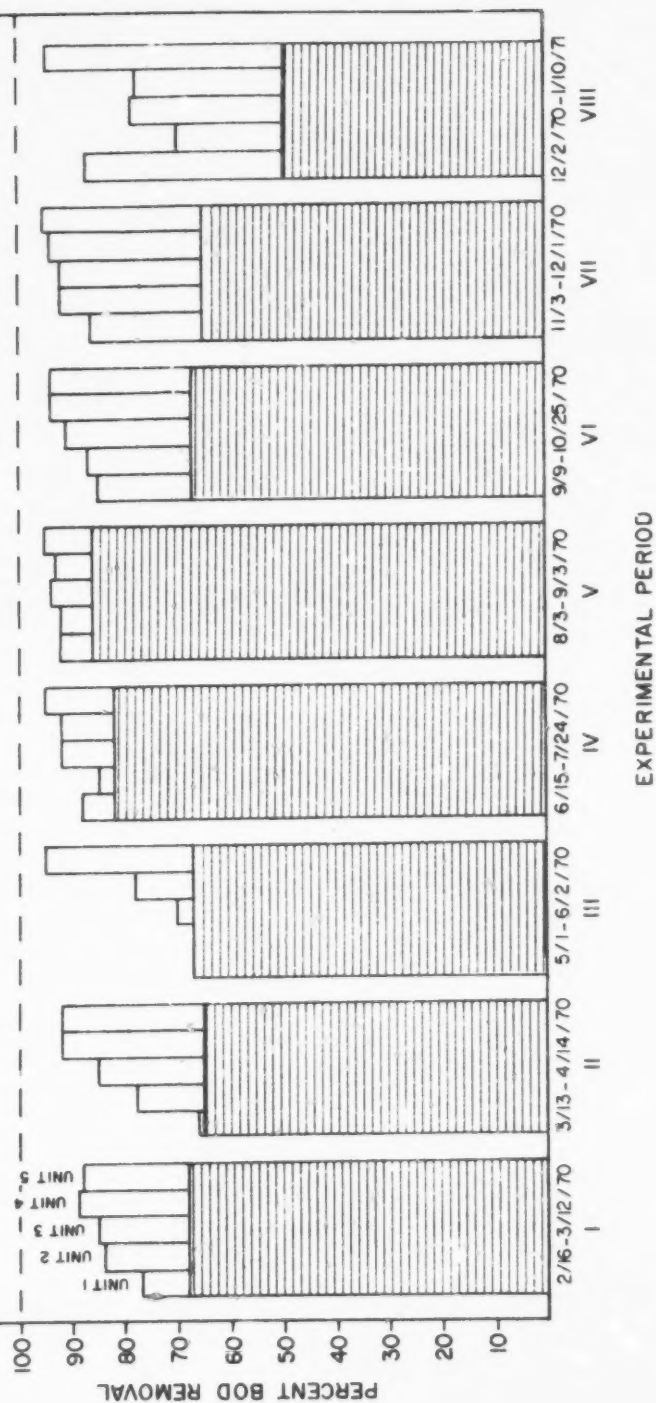
TABLE 6-7

AVERAGE PER CENT BOD REMOVAL BY ACTIVATED SLUDGE PILOT PLANTS
WITH SUBSEQUENT SOLIDS REMOVAL

Exp. Period	Avg. Inf. BOD, mg/l	% BOD Removal*				
		Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
I	60	87	87	85	93	93
II	60	88	87	92	95	95
III	72	86	87	93	95	95
IV	31	84	90	87	84	90
V	20	46	69	63	68	72
VI	35	86	90	87	92	95
VII	36	85	99	91	95	95
VIII	68	87	89	93	96	97

$$*\% \text{ BOD Removal} = \left[1 - \left(\frac{\text{Effluent BOD, Centrifuged}}{\text{Influent BOD, Uncentrifuged}} \right) \right] \times 100$$

Figure 6-3 - Percent Removal of BOD
in the Main Plant (shaded) and
Additional Removal in the Activated
Sludge Pilot Plants (open)



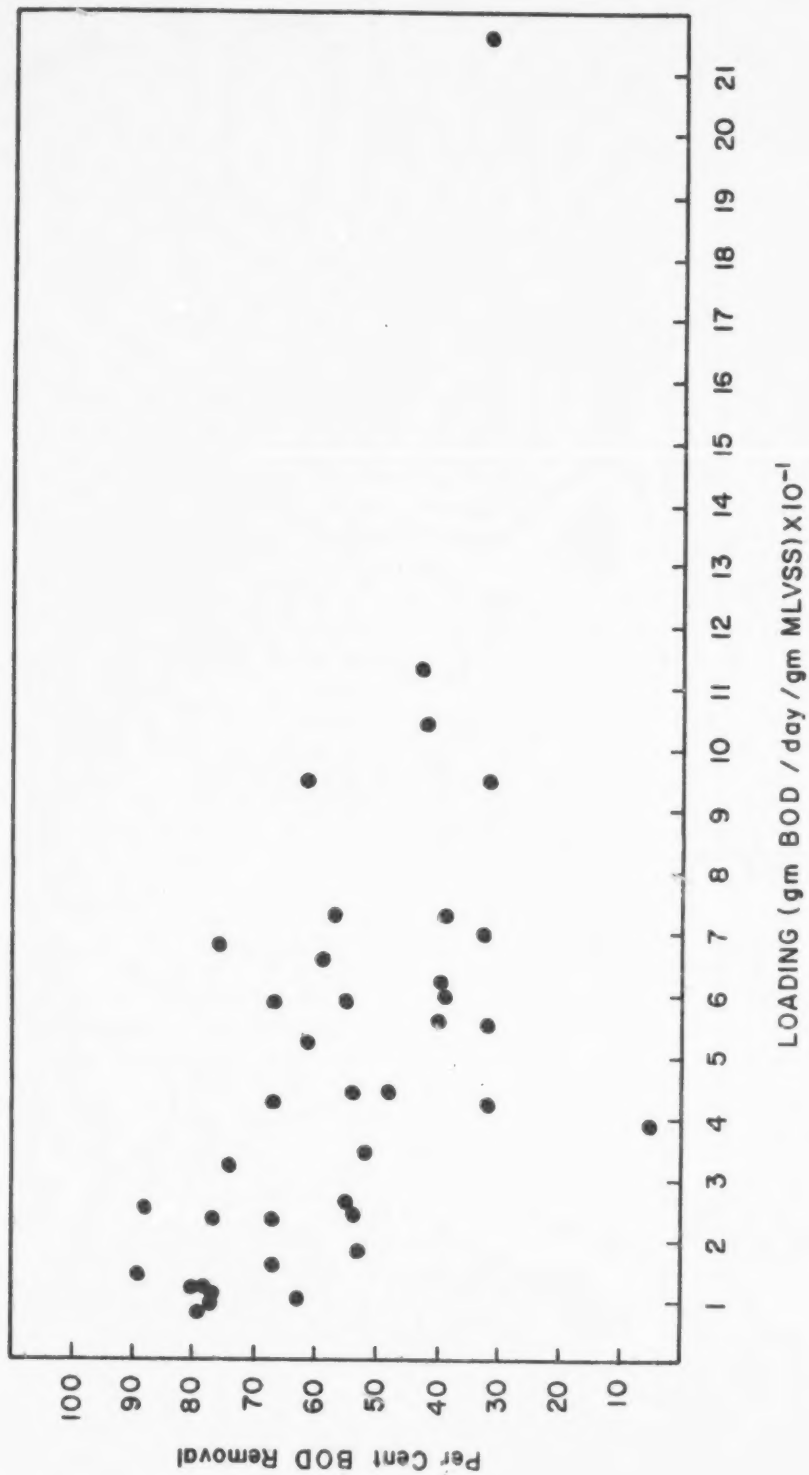


FIGURE 6-5 RELATIONSHIP OF BOD LOADING TO PER CENT BOD REMOVAL
IN ACTIVATED SLUDGE PILOT PLANTS.

All BOD removals are in excess of 93%. Thus, with optimum solids management even 0.4 hr. detention consistently may result in greater than 90% removal.

It has already been shown that the final settling tank in the present trickling filter plant improves overall removals by only 1-10%. Since this tank allows approximately 2 hrs. detention, it may be possible to economically convert it to contain an aeration and settling chamber as previously reported by Hansen *et al.* (30). Thus, performance could be substantially improved at low capital cost.

Figure 6-5 shows the relationship of BOD removal to BOD loading in the ASPP. These results are based on uncentrifuged samples, but the same type of relationship holds for centrifuged samples. As expected, BOD removal increased as loading decreased. This suggests improved trickling filter performance with greater BOD removal would allow better further removal in activated sludge units treating trickling filter effluent.

Removals of COD and organic were very similar to removal of BOD in the ASPP. MBAS reduction in the ASPP averaged 50-75% from trickling filter effluent with final effluent values of 0.2-0.8 mg/l. Phosphorus removal was nil through the ASPP, but the addition of activated sludge treatment to trickling filter plants may provide a convenient point for addition of chemicals for precipitation of phosphorus.

The results of this investigation established that activated sludge treatment of trickling filter effluent substantially increased overall BOD, COD, organic carbon, and MBAS removals. Furthermore, very short detention times were sufficient for substantial improvement. The amount of the increase was dependent upon the ability to remove solids from the effluent and carefully control returned sludge and wasting rates. It is realized that the magnitude of some of the results reported here may be due to the 25° temperature of the aeration units. Since the main interest of this investigation was to evaluate the effect of detention time and since the variation in size of the units would cause large variations in temperature, it was necessary to hold temperature constant. Experience with samples from short periods when the temperature controllers were out of order indicates that the temperature effect is not as great as one would might suppose.

3. Nitrification

Most of the nitrogen in the effluent of a typical high-rate trickling filter plant is in the form of ammonia. Ammonia released into receiving waters exerts an oxygen demand and serves as an algal nutrient. Incorporation of nitrification processes into waste treatment would insure oxidation of ammonia to nitrate, thus reducing oxygen demand of the effluent. In addition, oxidized nitrogen in nitrified effluents is amenable to removal by denitrification (32).

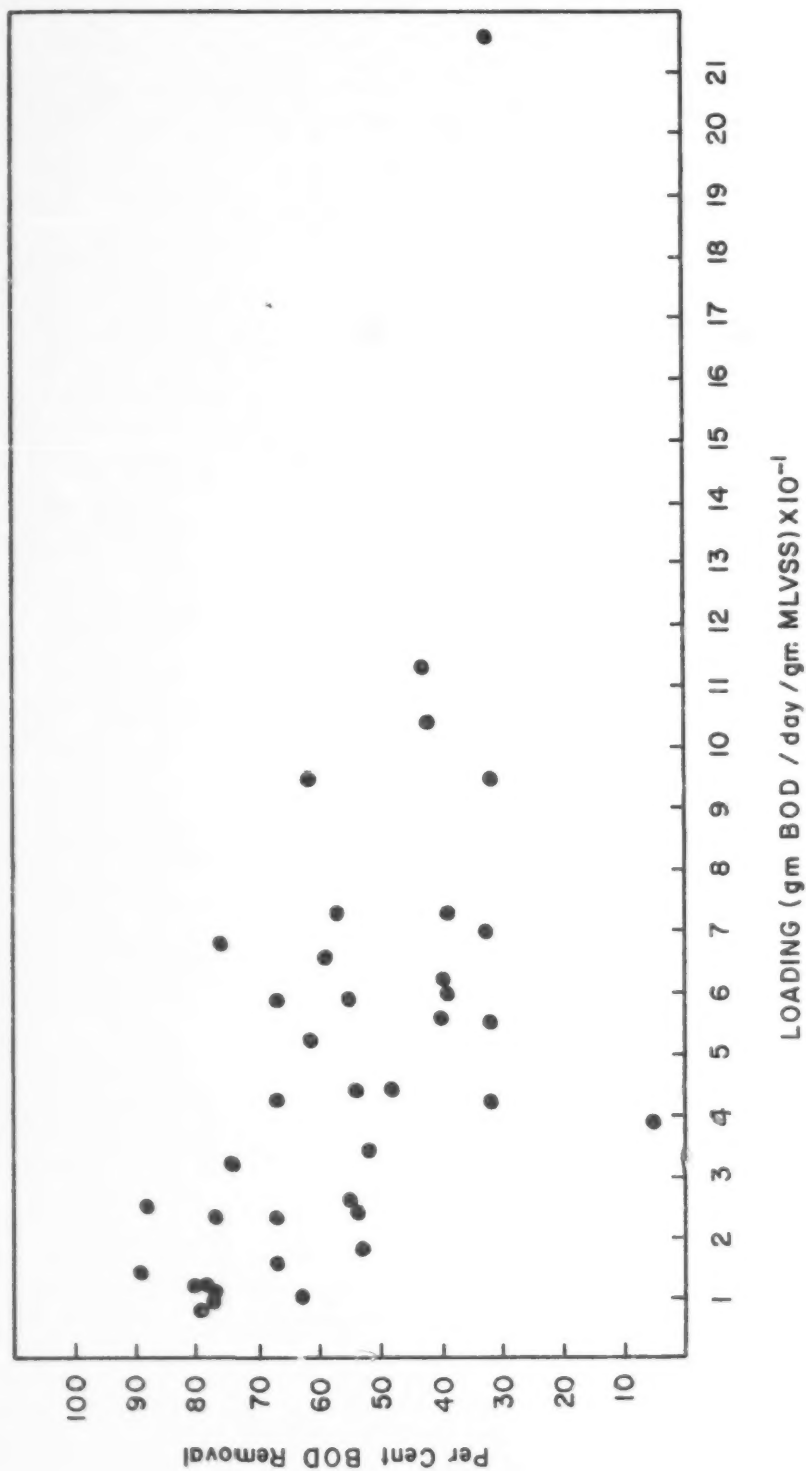


FIGURE 6-5 RELATIONSHIP OF BOD LOADING TO PER CENT BOD REMOVAL
IN ACTIVATED SLUDGE PILOT PLANTS.

Nitrification is a biological process. The most important genera of bacteria involved in nitrification are *Nitrosomonas*, which oxidizes ammonia to nitrite, and *Nitrobacter*, which oxidizes nitrite to nitrate (see reviews by Painter, 32; Alexander, 33; and Thimann, 34). These organisms are obligate autotrophs, requiring inorganic carbon in the form of carbon dioxide or bicarbonate. During nitrification, acidic products are formed from oxidation of ammonia and alkalinity is decreased due to consumption of inorganic carbon; thus, in poorly buffered systems the pH decreases. The nitrifying organisms are obligate aerobes, requiring an oxygen concentration of at least 0.5-0.6 mg/l (35, 36), with the possible exception of some marine species reported to operate at much lower oxygen concentrations (37). While oxygen concentrations of 1-7 mg/l are generally recommended for nitrification (35) it has been observed that nitrifying activated sludge can become acclimated to semiaerobic conditions (38).

Intimately related to the effect of oxygen concentration is the effect of loading. Wuhrmann (39) noted in his investigations that considerable nitrification took place at low (1 mg/l) oxygen concentrations provided that a low plant load was combined with high sludge concentrations; on the other hand, no nitrification took place even at 7 mg/l with high loading rates. Other investigators (40, 41) have also noted significant decrease in nitrification with increased loading.

There are a number of ways in which high loading may affect nitrification. High loading may result in higher concentrations of inhibitory compounds in the nitrification unit. Many organic compounds inhibit nitrification, among them gelatin, some amines, alkaloids, and amino acids (34). Higher loading could conceivably increase ammonia concentration in the aerator to a level intolerable to nitrifiers. Both *Nitrosomonas* and *Nitrobacter* are inhibited by high levels of ammonia; the latter, more sensitive, does not develop in many cases until the ammonia level has been reduced by *Nitrosomonas* (34). High loading also increases the concentration of carbonaceous materials which are readily assimilable by heterotrophic bacteria. It is the opinion of several investigators that the inhibitory effect of most organic materials on nitrification is due to their stimulation of rapid-growing heterotrophs which assimilate the majority of the inorganic nitrogen, making it unavailable to the slower growing nitrifiers (33, 42). In addition, if high loading necessitates sludge wasting from an activated sludge unit, the removal of the slow-growing nitrifiers can prevent development of a population large enough to accomplish nitrification.

Since the nitrifying bacteria are obligately autotrophic, inorganic carbon is an essential nutrient for their growth. Thus, nitrifiers may be limited by availability of inorganic carbon in the same manner as are algae (43, 44, 45). Little information is available on the effect of inorganic carbon concentration on the efficiency of nitrification processes. In addition, it is difficult to distinguish the relative importance of inorganic carbon availability because of the common practice, both in basic and applied investigations, of adding bicarbonate or carbonate alkalinity to the feed to control pH (29, 34, 42, 46, 47).

The optimum pH for nitrification is currently a controversial topic. It has been variously reported from pH 6.0 (47) to pH 8.8 (34). Meek and Lipmann (48) reported the isolation of organisms capable of nitrification at pH 4.1. Wild, Sawyer, and McMahon (49) report that the optimum pH for nitrification by activated sludge is 8.4 with 50% of the maximum rate occurring at pH's of 7.0 and 9.8. Rimer and Woodward (50), on the other hand, were unable to maintain nitrification in their activated sludge system at pH lower than 8.3-8.5. Recent reviews of the effect of pH on nitrification in soil (33, 51) described instances in which nitrification occurred at pH's as low as 4.0-4.5; both reviews indicate the possibility that there are little known species of nitrifiers adapted to low pH. Alexander (33) cites studies indicating that some isolates from alkaline soils have an optimum of 7.8.

Changes in pH may affect nitrification in several ways. pH may affect essential biochemical reactions, or alter the toxicity of metals or cyanide (36, 46). A low pH is also an indication that the alkalinity has been depleted.

The optimum temperature for nitrification is 30-35 C (34) although nitrification can occur over the range 5-40 C (33).

While a number of investigations have been performed on nitrification processes in wastewater, few studies have been performed on the application of the activated sludge process for upgrading trickling filter effluent. Two previous studies in this category are those of Wild, Sawyer, and McMahon (49) and Vosloo and Finsen (29).

Vosloo and Finsen (29) investigated application of the activated sludge process to improvement of a low-rate filter effluent in both batch and continuous studies over a one-month period. In a continuous feed unit operated with 17-30 mg/l influent $\text{NH}_3\text{-N}$, a 2.9 hr aeration period, and a MLSS concentration of 8000 mg/l, an average of 85% of the ammonia was removed. Further studies performed with an excess of alkalinity in the form of powdered calcium carbonate showed that oxidation of 1 gm/l of nitrogen caused a decrease in alkalinity of 7.15 mg/l. Vosloo and Finsen found that appropriate batch addition of powdered calcium carbonate maintained the pH above 6, allowed nitrification to proceed to completion, and greatly improved settleability of the sludge.

Wild, Sawyer, and McMahon (49) investigated nitrification in a pilot activated sludge unit receiving settled high-rate trickling filter effluent and in laboratory batch studies. Effect of pH, MLVSS concentration, ammonia concentration, and BOD on nitrification were studied in batch studies. pH was controlled by addition of sodium hydroxide. From short-term (3 hr) experiments, the following conclusions were drawn:

1. ammonia concentration does not inhibit nitrification at concentrations less than 60 mg/l
2. pH sharply affects rate of nitrification; optimum pH is 8.4

3. increases in temperature increase rate of nitrification, in the range of 5-30 C
4. for a given sludge, with MLVSS concentrations in the range 800-6000 mg/l, the time to completely nitrify a given amount of ammonia per gram of MLVSS is constant under the same environmental conditions
5. instantaneous increases in BOD concentration over the range 5-110 mg/l do not affect rate of nitrification.

During pilot-plant activated sludge studies at Chapel Hill nitrification was consistently noted in several of the units, leading to further investigations on the factors affecting nitrification.

In the following discussion of results from these studies, performance of the units under the various modes of operation is presented in terms of ammonia removal, though it must be understood that the ammonia nitrogen is not removed but rather converted to oxidized forms -- nitrite and nitrate -- during nitrification. The observation that some denitrification was occurring in the final settling tanks made it desirable to express the results in terms of ammonia disappearance rather than in terms of nitrate increase.

As shown in Figure 6-6, some ammonia removal occurred during all phases of operation. In general, units with the longer detention times removed a higher percentage of the ammonia. Of a total of 40 cases (5 units, 8 operational phases) there were 10 cases in which 90% or more of the ammonia was removed and 6 cases in which 45% or less was removed. A summary of the average values of several operating parameters, contrasting these values in cases of high and low removal, is presented in Table 6-8. From Table 6-8, it is apparent that maximum removals are usually, but not exclusively, correlated with low influent BOD, long detention time, low loading, low MLSS, and adequate bicarbonate alkalinity. A cursory examination of pH would seem to indicate that low pH is also associated with maximum removal, but the lower pH levels are probably simply an effect of extensive nitrification.

In order to simplify interpretation of the results obtained under different operating conditions, the amount of ammonia removed as a function of detention time is presented in Figures 6-7 - 6-10.

Figure 6-7 shows ammonia removal under conditions of no sludge wasting and no alkalinity addition. Note that while the influent ammonia concentrations are similar, average influent BOD varied from 35-68 mg/l. In general, ammonia removal was greatest during the phase when influent BOD was lowest; poorer, during the phases when influent BOD was 60-63.

The effect of alkalinity addition (bicarbonate) on ammonia removal is shown in Figures 6-8 and 6-9. Under these conditions of no sludge wasting and low (35-36) BOD in the influent (Figure 6-8) alkalinity addition had little effect at the shorter detention times, but at longer detent-

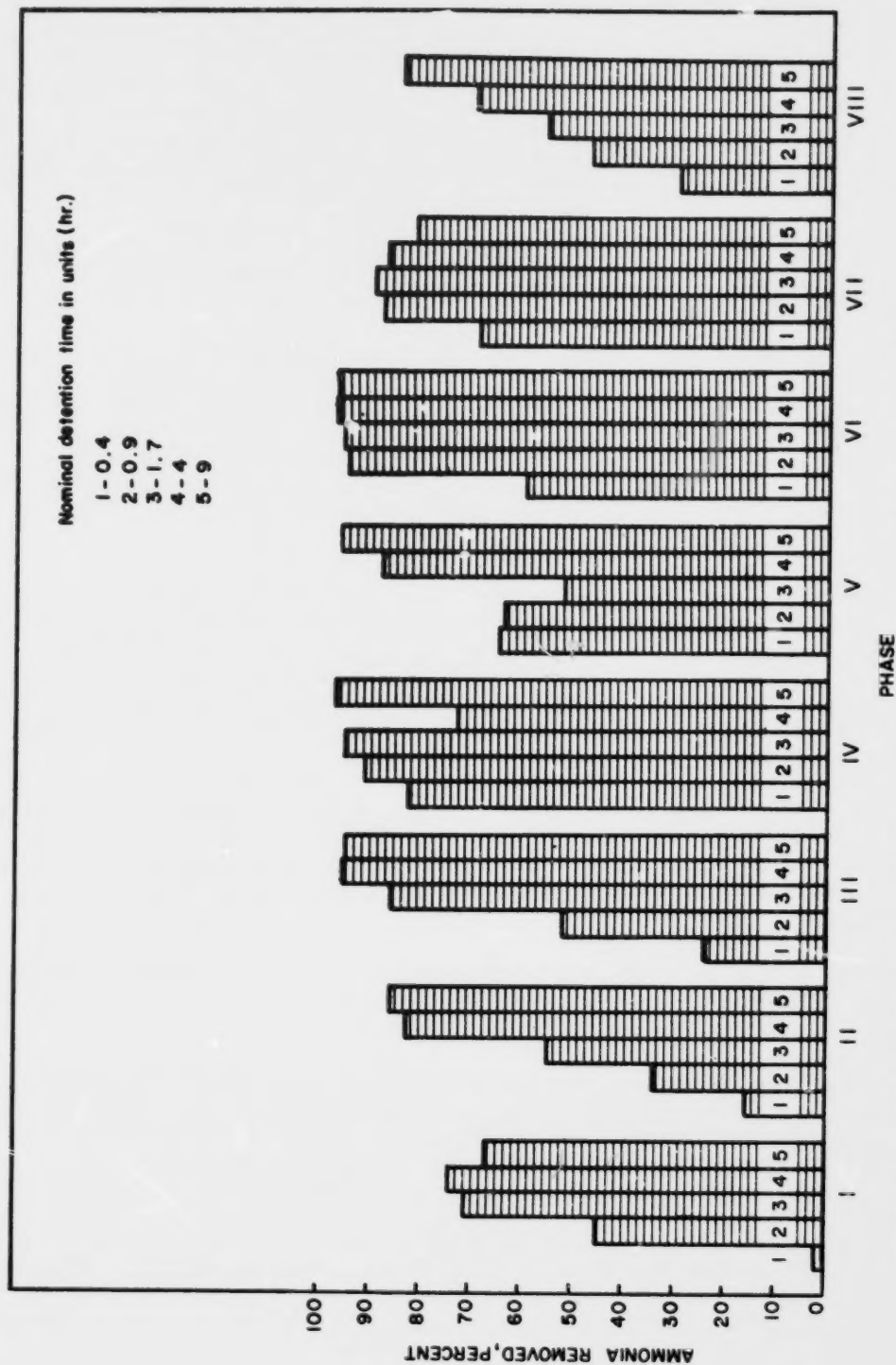


FIGURE 6-6 --- AMMONIA REMOVAL IN ACTIVATED SLUDGE PILOT PLANTS DURING 8 PHASES OF OPERATION.

TABLE 6-8

PARAMETERS DURING PERIODS OF MAXIMUM AND MINIMUM AMMONIA REMOVAL

Parameter	Maximum Removal (90% or more)		Minimum Removal (45% or less)	
	Range*	Avg.**	Range*	Avg.**
pH	6.3-7.3	6.8	7.0-7.5	7.2
Influent BOD (mg/l)	20-72	40	60-72	63
Influent NH ₃ -N (mg/l)	13.0-24.0	19.8	19.4-26.8	22.5
Hydraulic Detention Time (hr)	0.95-9.5	4.5	0.39-1.05	0.61
Loading 1b BOD/day	0.06-0.52	0.19	0.26-0.51	0.38
1b MLSS under aeration				
MLSS Concentration (mg/l)	260-6670	2155	3240-12630	8060
Dissolved Oxygen (mg/l)	4.2-7.1	6.0	3.3-5.8	4.9
Bicarbonate addition	10 of 10 cases		3 of 6 cases	

*Range of mean values obtained for units during operational phases.

Daily values varied over a wider range.

**Average of mean values obtained for units during operational phases.

TABLE 6-9

EFFECT OF BICARBONATE ADDITION ON AVERAGE pH AND INORGANIC CARBON CONCENTRATIONS IN ACTIVATED SLUDGE UNITS RECEIVING INFLUENT WITH LOW BOD (35-36 mg/l)

NO BICARBONATE Phase 7			BICARBONATE Phase 6	
UNIT	pH	Inorg. C (mg/l)	pH	Inorg. C (mg/l)
1	5.7	10.5	7.3	27.4
2	5.7	1.0	6.7	8.2
3	5.6	0.2*	6.8	11.1
4	5.4	0.3*	6.7	7.3
5	5.1	0*	6.7	3.5*

*Inorg. C concentration 0 at times.

TABLE 6-10

EFFECT OF BICARBONATE ADDITION ON AVERAGE pH AND INORGANIC CARBON CONCENTRATIONS IN ACTIVATED SLUDGE UNITS RECEIVING INFLUENT WITH HIGH BOD (60-68 mg/l)

UNIT	NO BICARBONATE				BICARBONATE	
	(Phase 1)		(Phase 8)		(Phase 2)	
	pH	Inorg. C (mg/l)	pH	Inorg. C (mg/l)	pH	Inorg. C. (mg/l)
1	7.3	24.1	7.2	23.5	7.4	29.7
2	7.0	15.1	7.0	19.3	7.3	25.0
3	6.5	6.4	6.9	13.5*	7.1	16.5
4	5.3	4.3	6.6	8.7*	6.8	10.4
5	4.7	3.5	6.1	0.6*	6.1	4.2

*Inorganic C concentration 0 at times.

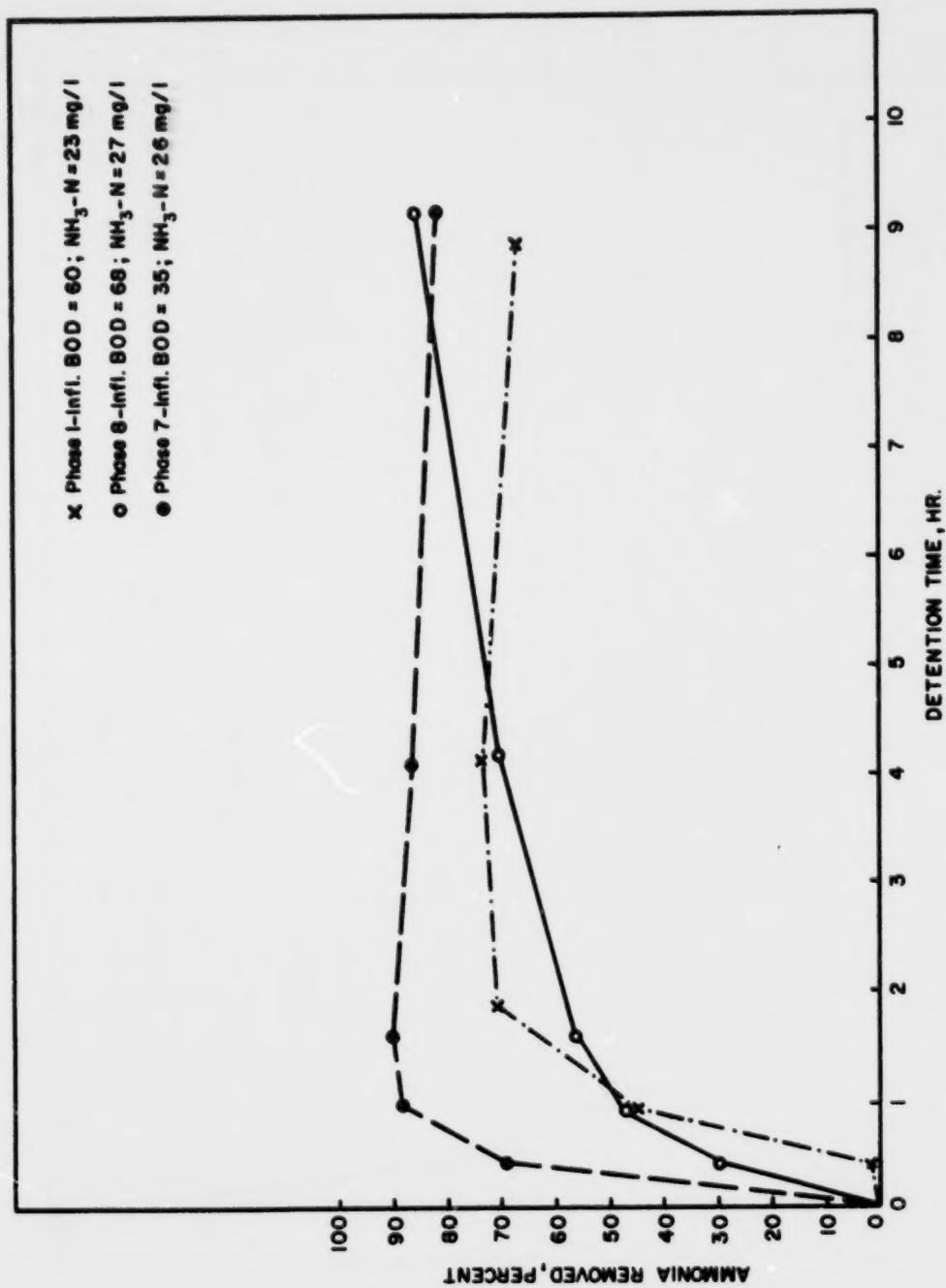


FIGURE 6-7 -- AMMONIA REMOVAL UNDER CONDITIONS OF NO SLUDGE WASTING AND NO BICARBONATE ADDITION

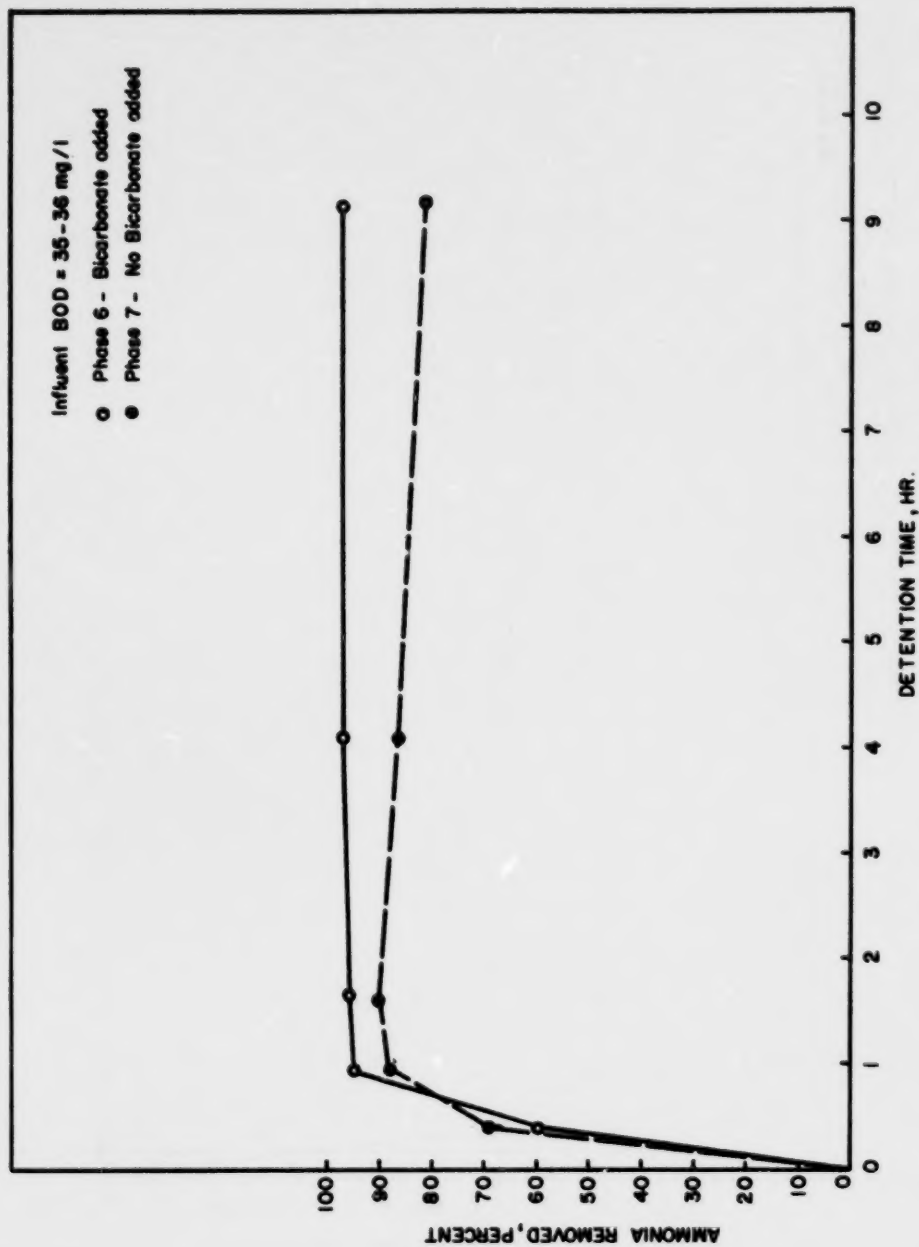


FIGURE 6-8 -- AMMONIA REMOVAL UNDER CONDITIONS OF NO SLUDGE WASTING AND LOW INFLUENT BOD: EFFECT OF BICARBONATE ADDITION

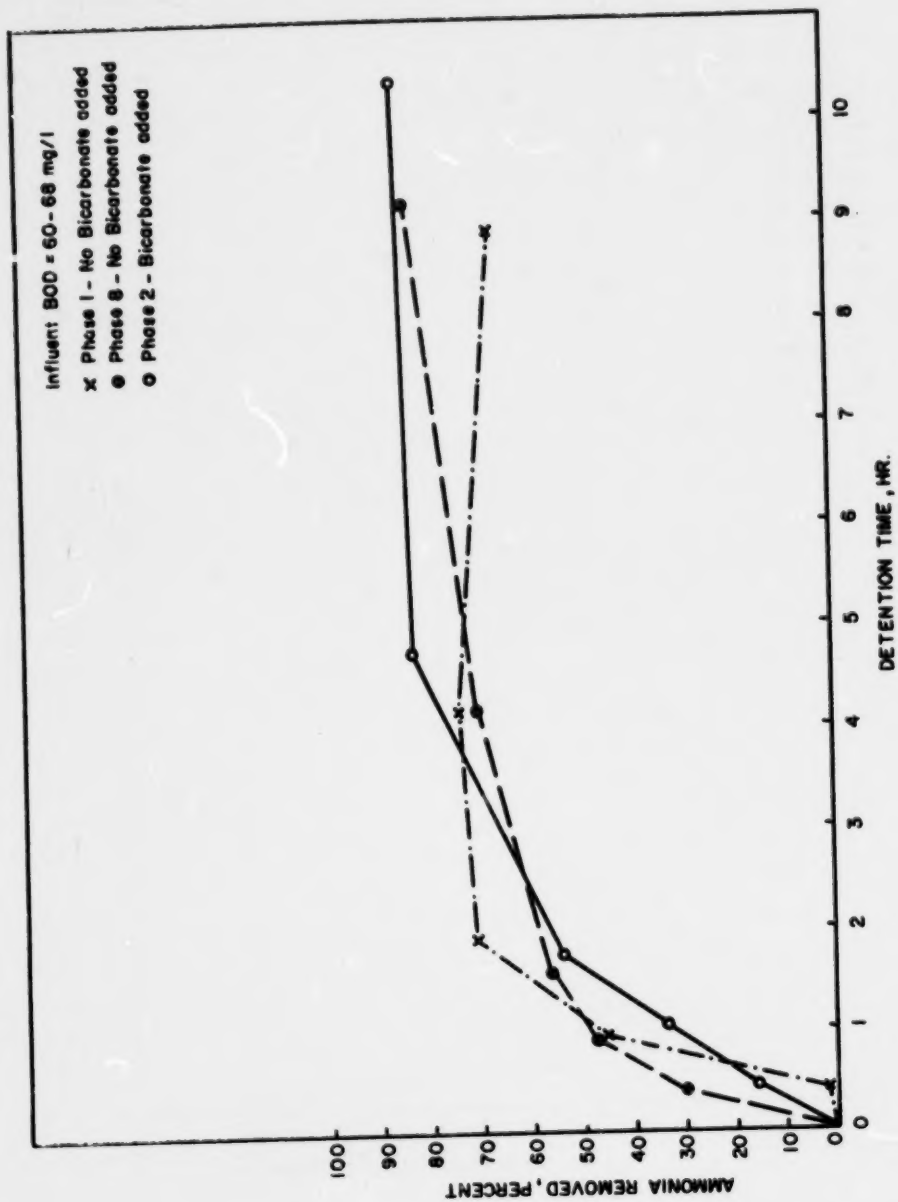


FIGURE 6-9 -- AMMONIA REMOVAL UNDER CONDITIONS OF NO SLUDGE WASTING AND HIGH INFLUENT BOD: EFFECT OF BICARBONATE ADDITION.

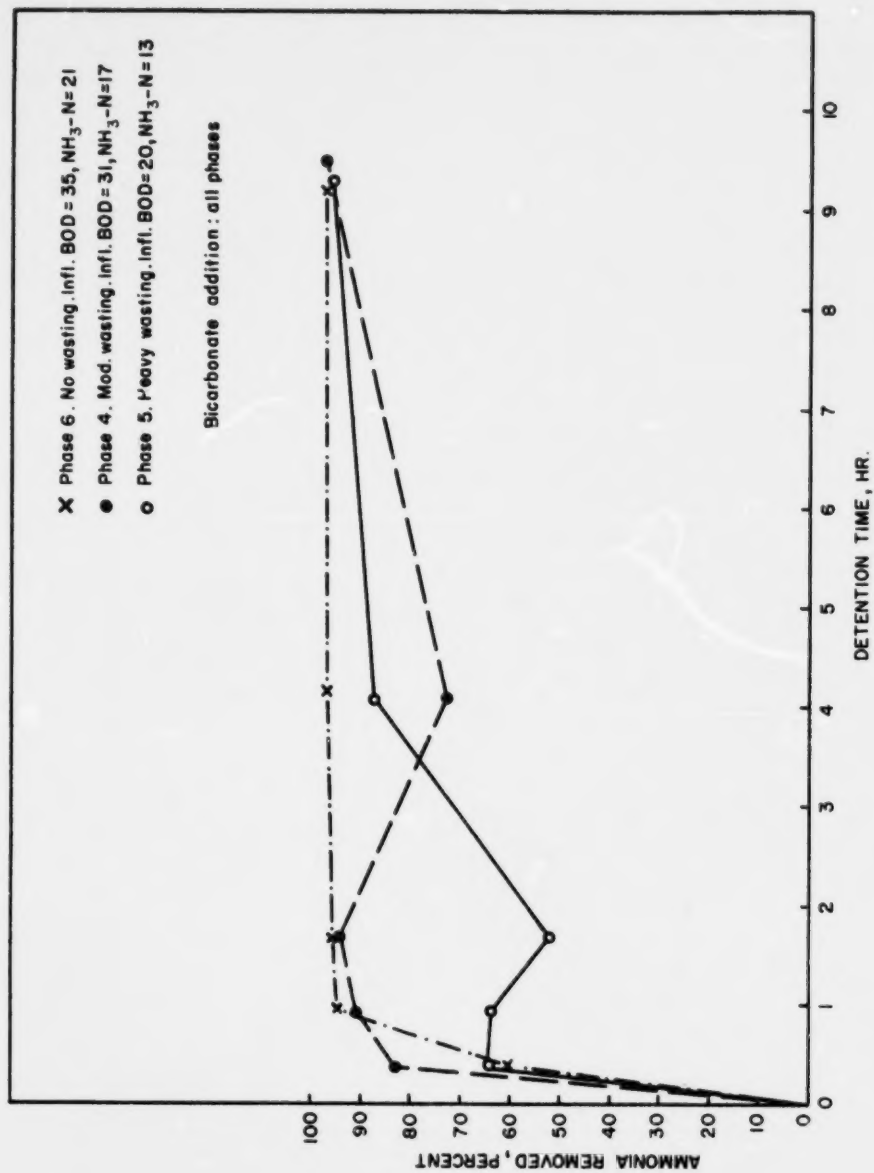


FIGURE 6-10. AMMONIA REMOVAL DURING VARIOUS PATTERNS OF SLUDGE WASTING.

ion times, the extent of ammonia removal was less when alkalinity was not added. Since bicarbonate addition serves both to provide inorganic carbon and to control pH, distinguishing between pH and inorganic carbon concentration effects is not possible under the conditions of these experiments. During phase 7, without alkalinity addition, inorganic carbon concentration in the units was low, as shown in Table 6-9.

Under conditions of high influent BOD (Figure 6-7) effect of alkalinity addition was not as clear. However, the depression of ammonia removal under conditions of long detention time and no alkalinity addition was noted in one case. A comparison of pH and inorganic carbon concentrations is shown in Table 6-10. The drastic drop in pH to 4.7 in Unit 5, phase 1, may account for the poor performance as compared to the same unit during phase 8 (Figure 6-9). The pH in the unit remained above pH 6 during phase 8, despite low inorganic carbon concentrations; the reason for this phenomenon is not known.

The effect of sludge wasting on the units is shown in Figure 6-10. On the whole, moderate sludge wasting did not affect nitrification performance, but high rates of wasting hindered nitrification at the intermediate detention times.

The relationship of ammonia removal to mixed liquor suspended solids concentration is presented in Figures 6-11 -- 6-15.

Variations in MLSS concentration in the same unit during different phases of operation are shown. In cases in which influent BOD was less than 40 mg/l, the amount of ammonia removed was roughly proportional to the MLSS concentration, up to some optimal concentration for the unit. Compari-

sons of the different units on the basis of $\frac{\text{mg NH}_3\text{-N removed}}{\text{mg MLSS}}$ we consider

to be invalid. Biological examination of the sludge in the five units revealed significant differences in the flora and fauna. A six-week study of the protozoa in the units indicated marked differences in both numbers of protozoa and in species present (James and Little, 52). While large numbers of protozoa, especially stalked ciliates, were present at the shorter detention times, very few protozoa were present at the longer detention times. In order to make a valid assessment of the relationship of MLSS concentration to ammonia removal, it will be necessary to find some way to measure the relative weight of nitrifying bacteria in each sludge.

The possible enhancement of nitrification by activated sludge treatment following high-rate trickling filtration is indicated in Tables 6-11 and 6-12. Change in concentration of various nitrogen forms during treatment, from the plant influent, filter effluent, and plant effluent to the effluents from the activated sludge pilot units, is shown in Table 6-11. Note that during cold seasons little nitrogen removal occurred in the main plant; in warm seasons some nitrogen removal occurred, and a

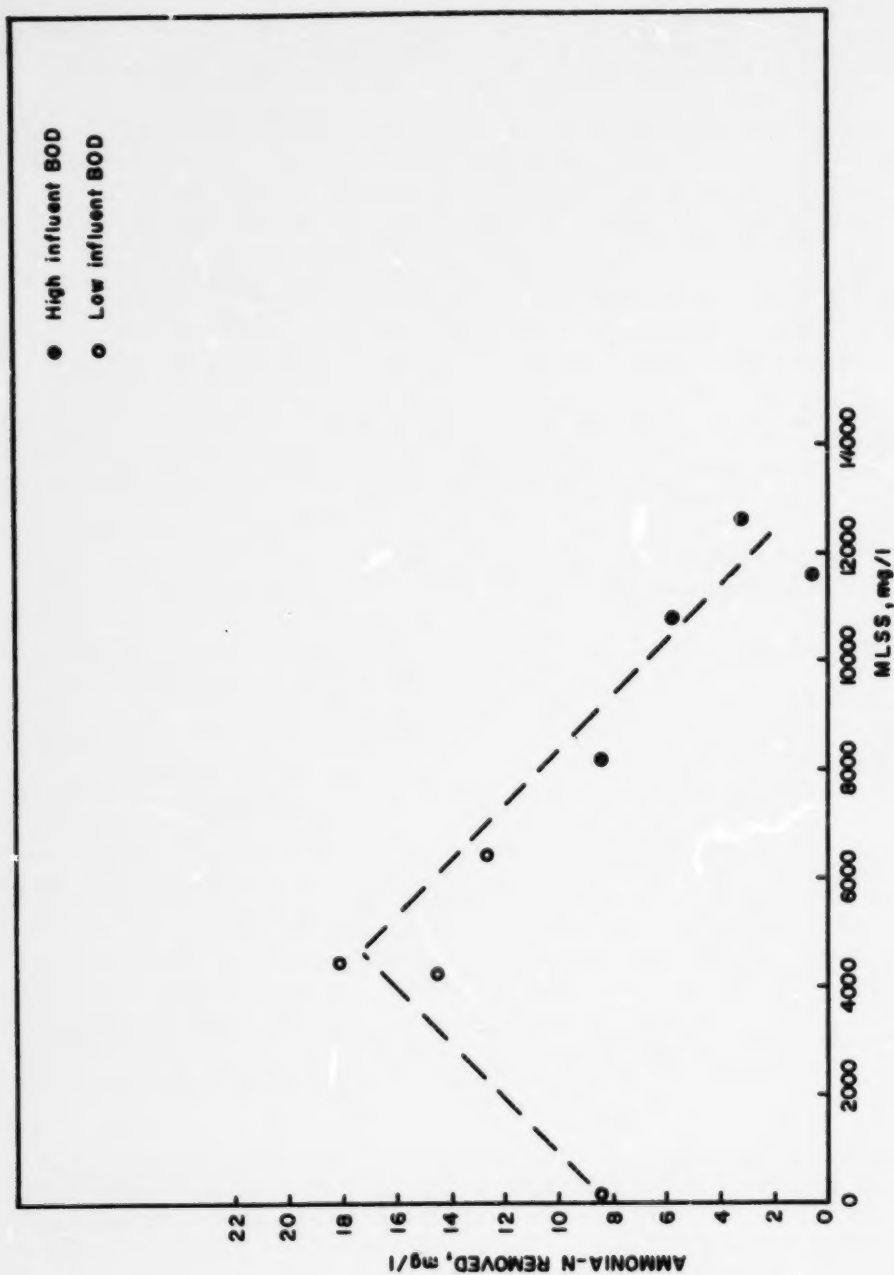


FIGURE 6-11 -- AMMONIA REMOVAL AS A FUNCTION OF MIXED LIQUOR SUSPENDED SOLIDS CONCENTRATION, UNIT 1.

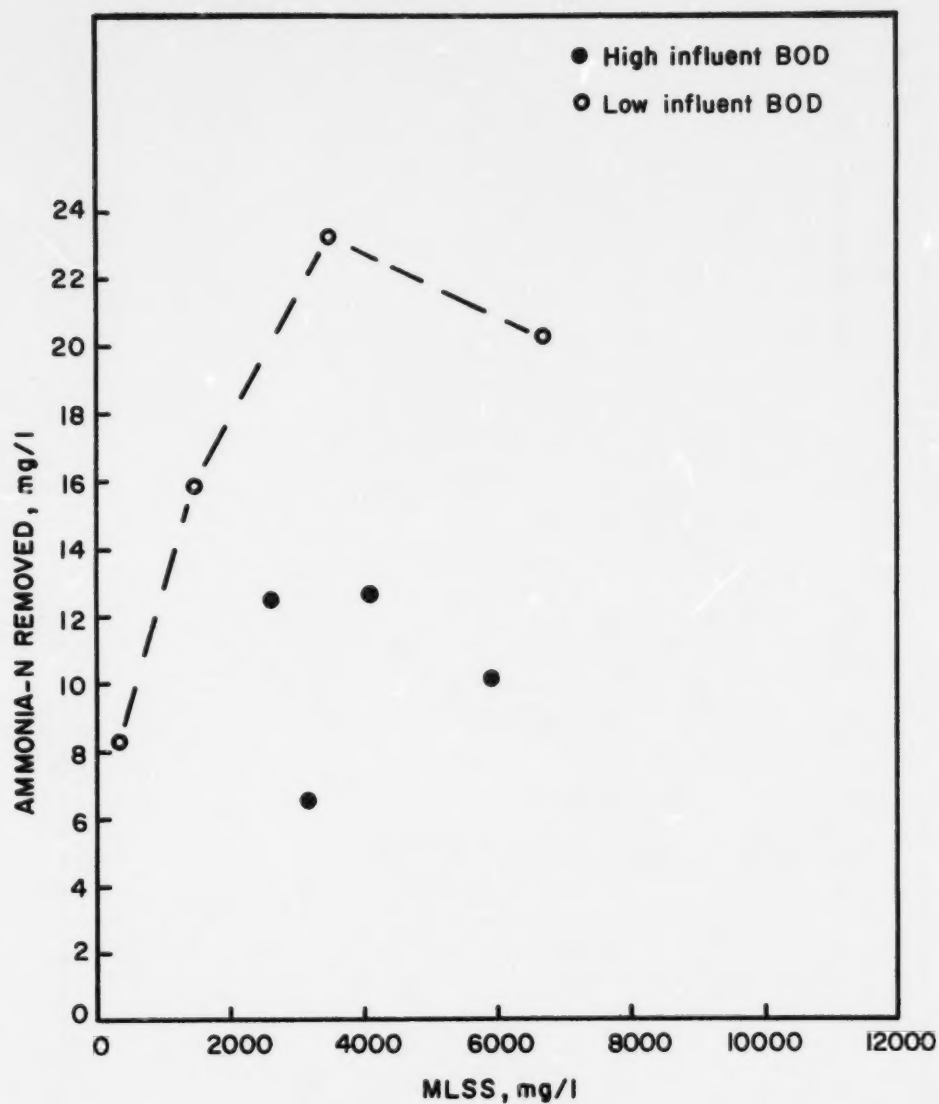


FIGURE 6-12. AMMONIA REMOVAL AS A FUNCTION MIXED LIQUOR SUSPENDED SOLIDS CONCENTRATION, UNIT 2.

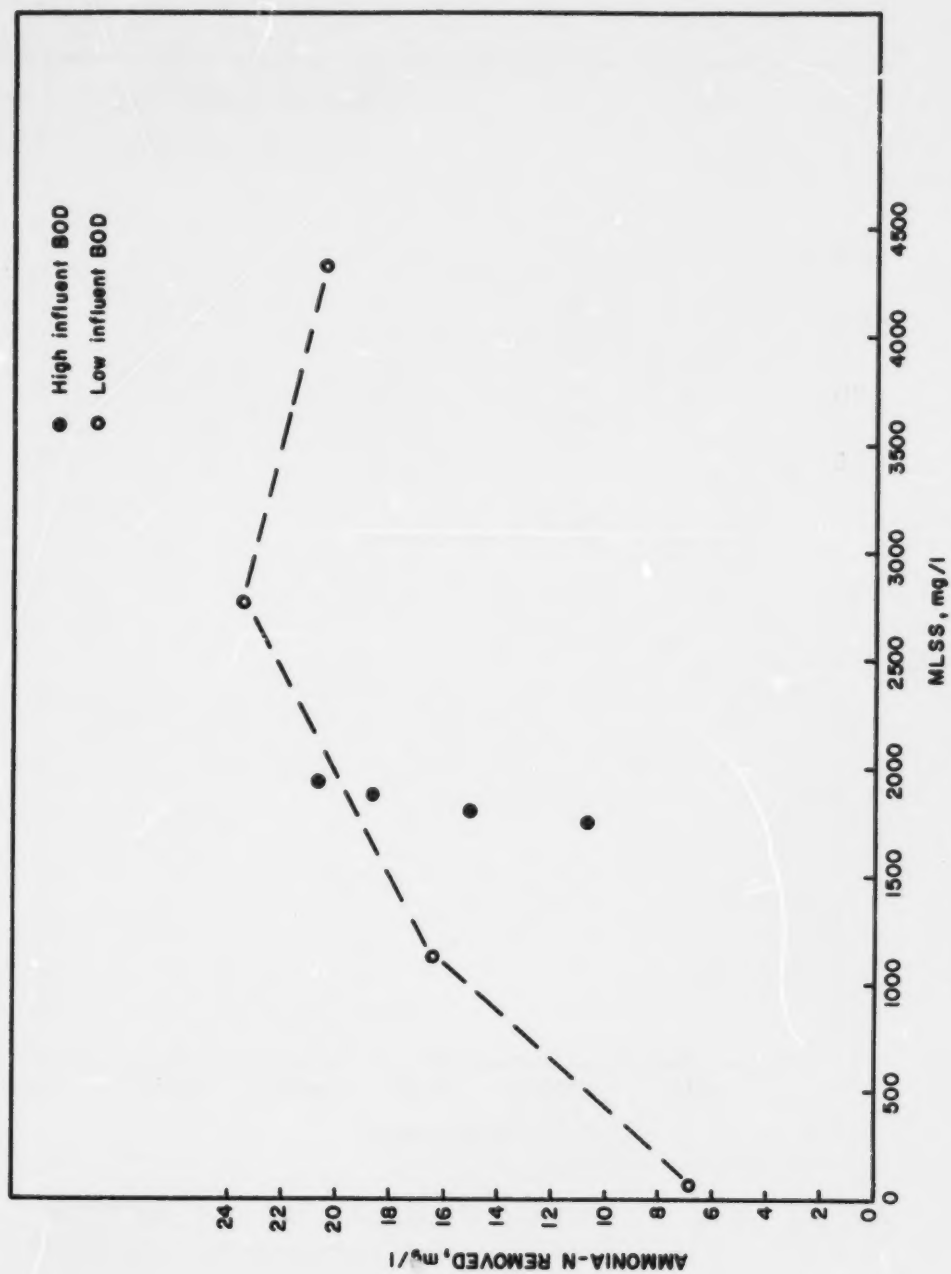


FIGURE 6-13 --- AMMONIA REMOVAL AS A FUNCTION OF MIXED LIQUOR SUSPENDED SOLIDS CONCENTRATION, UNIT 3.

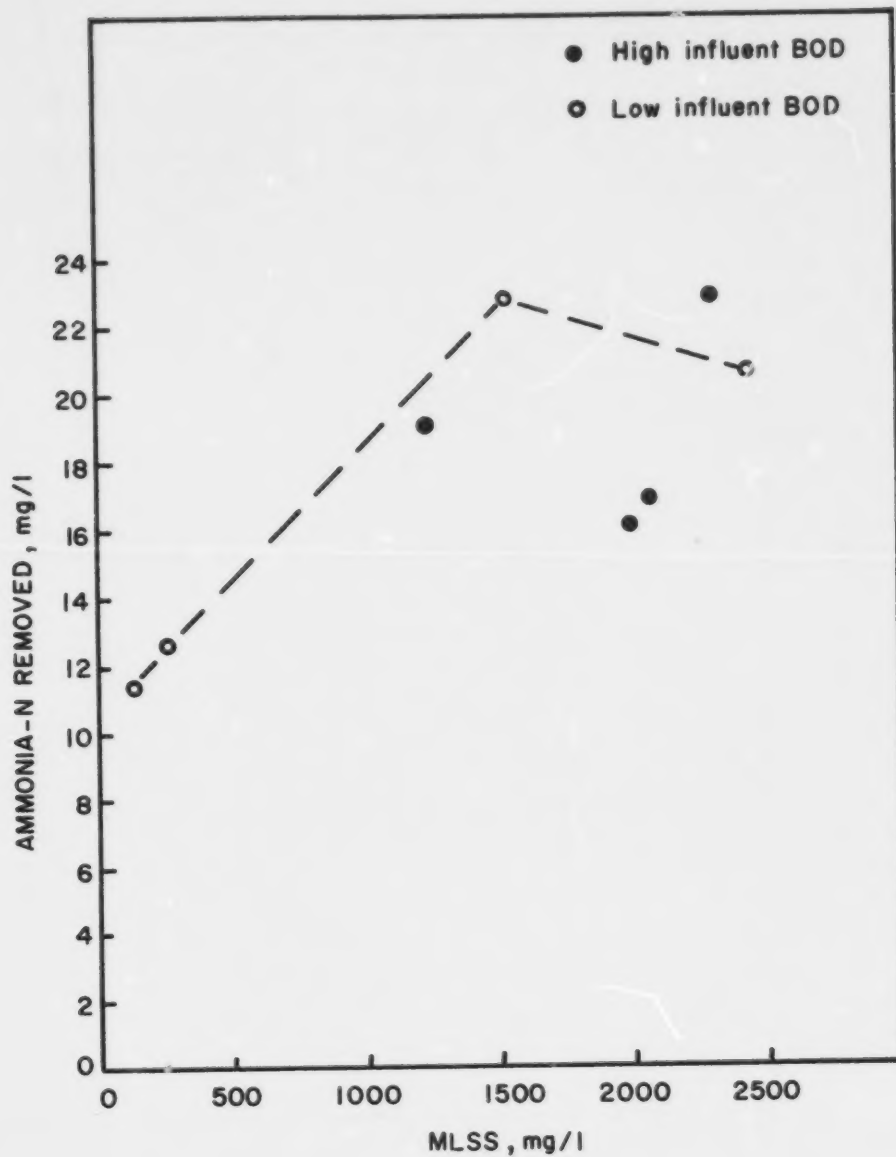


FIGURE 6-14. AMMONIA REMOVAL AS A FUNCTION MIXED LIQUOR SUSPENDED SOLIDS CONCENTRATION, UNIT 4.

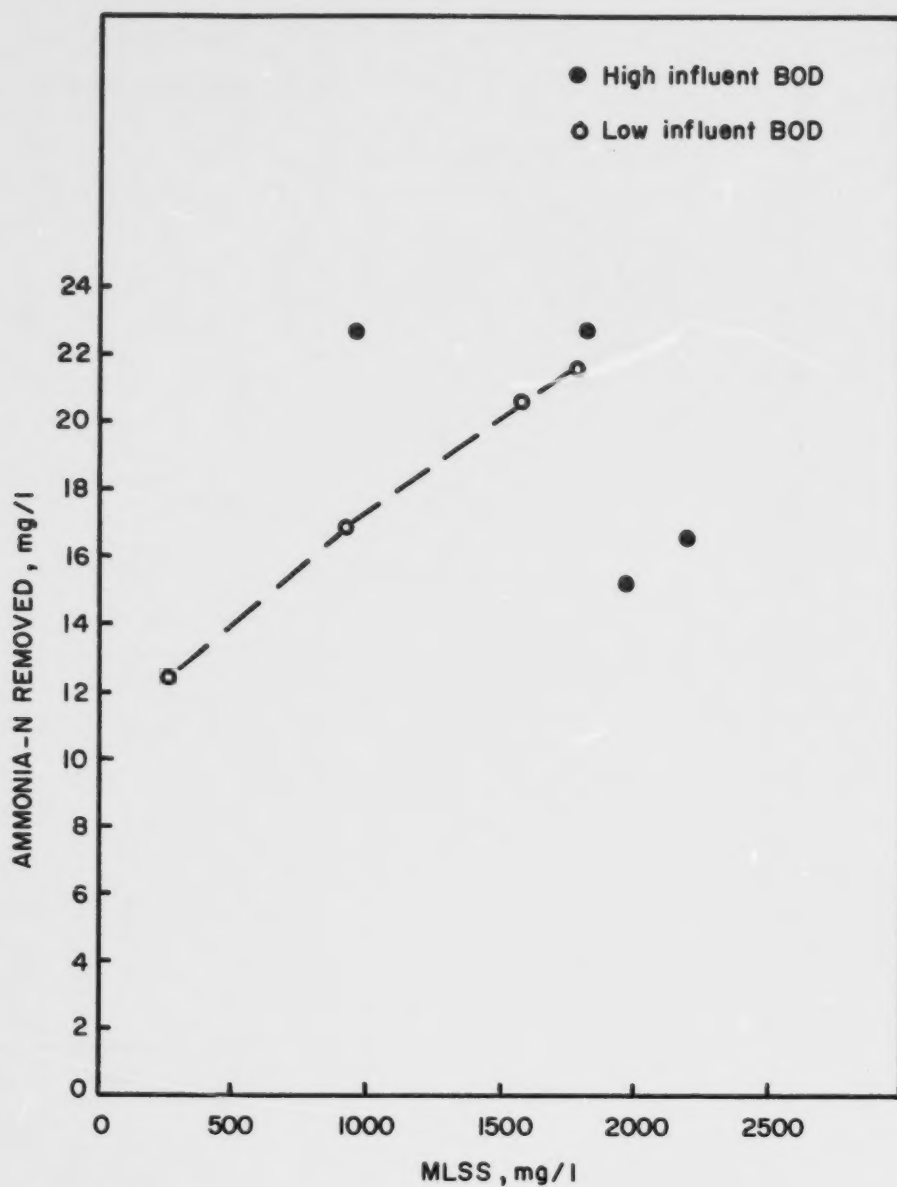


FIGURE 6-15. AMMONIA REMOVAL AS A FUNCTION MIXED LIQUOR SUSPENDED SOLIDS CONCENTRATION, UNIT 5.

TABLE 6-11. CHANGES IN CONCENTRATION OF VARIOUS NITROGEN FORMS DURING TREATMENT

Phase	Form	N-Concentration (mg/l)							
		Plant Influent	Filter Effluent*	Plant Effluent	Activated Sludge Pilot Plants				
					A-1	A-2	A-3	A-4	A-5
I	Kjeld	35.7	38.3	31.8	59.0	23.2	12.3	10.7	11.0
	NH ₃	20.0	22.8	21.0	22.4	12.6	6.6	6.0	7.6
	NO ₂ -		0.10		0.15	1.72	0.76	0.45	0.60
	NO ₃ -		0.43		0.35	1.60	12.12	15.40	16.40
	Total		38.8		59.5	26.5	25.2	26.6	28.0
II	Kjeld	37.6	34.7	33.5	62.4	27.1	14.6	6.5	6.1
	NH ₃	22.2	19.4	22.5	16.3	13.0	8.8	3.3	2.8
	NO ₂ -		0.04		0.26	2.16	1.17	0.20	0.15
	NO ₃ -		0.64		0.36	1.06	4.94	11.68	13.96
	Total		35.38		63.0	30.3	20.7	18.4	20.2
III	Kjeld	33.0	30.0	30.0	29.5	17.1	7.1	9.0	3.9
	NH ₃	22.5	24.0	24.0	18.3	11.5	3.3	1.1	1.2
	NO ₂ -		0.02		0.26	1.11	0.82	0.05	0.05
	NO ₃ -		0.35		1.19	5.2	12.8	15.6	16.3
	Total		30.4		31.0	23.4	20.7	24.6	20.2
IV	Kjeld	35.5	24.9	22.3	10.2	9.3	6.2	11.2	5.2
	NH ₃	22.0	17.4	17.6	3.0	1.6	0.9	4.7	0.5
	NO ₂ -		0.04		0.5	0.7	0.37	0.93	0.14
	NO ₃ -		0.39		9.2	12.0	13.4	8.8	15.1
	Total		25.3		19.9	22.0	20.0	20.9	20.4
V	Kjeld	31.4	16.9	17.5	8.0	9.8	10.7	5.1	3.6
	NH ₃	22.1	13.0	13.2	4.6	4.7	6.2	1.6	0.52
	NO ₂ -		0.17		0.44	0.34	0.30	0.49	0.07
	NO ₃ -		0.39		6.04	5.6	4.3	8.3	11.0
	Total		17.7		14.5	15.7	15.3	13.9	14.7
VI	Kjeld	31.7	26.1	26.4	15.1	4.9	3.8	3.2	4.1
	NH ₃	23.5	21.3	22.4	8.6	1.1	0.9	0.6	0.6
	NO ₂ -		0.03		0.57	0.13	0.08	0.05	0.05
	NO ₃ -		0.46		4.1	10.3	11.5	12.6	12.8
	Total		26.6		19.8	15.3	15.4	15.8	17.0
VII	Kjeld	36.9	29.4	30.1	13.9	6.7	7.0	7.7	8.2
	NH ₃	23.9	26.3	24.5	8.2	3.1	2.8	3.5	4.7
	NO ₂ -		0.04		0.75	0.23	0.07	0.04	0.02
	NO ₃ -		0.33		7.2	10.1	11.8	11.2	11.8
	Total		29.8		21.8	17.0	18.9	18.9	20.0
VIII	Kjeld	32.9	31.6	31.9	26.6	33.5	27.3	19.2	8.9
	NH ₃	22.6	26.8	22.5	18.6	14.1	11.7	7.8	4.2
	NO ₂ -		0.03		0.11	0.30	0.19	0.10	0.12
	NO ₃ -		0.28		0.97	3.10	5.60	7.50	10.5
	Total		31.9		27.7	36.9	33.1	26.8	19.5

*Influent to activated sludge units

TABLE 6-12. CHANGE IN NITROGENOUS OXYGEN DEMAND (NOD) OF WASTEWATER WITH DIFFERENT DEGREES OF TREATMENT

Phase	Sample Type	NOD							
		Plant Influent	Filter Effluent	Plant Effluent	Activated A-1	Sludge A-2	Pilot A-3	Plants A-4	Plants A-5
I	Uncent.	154	167	138	255	100	53	46	48
	Cent.		132		110	68	40	29	34
II	Uncent.	163	150	145	270	117	63	28	27
	Cent.		119		87	73	44	21	16
III	Uncent.	143	130	130	128	74	31	39	17
	Cent.		108		90	63	26	9	9
IV	Uncent.	154	108	96	44	40	27	48	22
	Cent.		85		30	17	15	31	12
V	Uncent.	136	73	76	35	42	46	22	16
	Cent.		64		28	31	39	16	10
VI	Uncent.	137	113	114	65	21	16	14	18
	Cent.		97		42	12	10	8	7
VII	Uncent.	160	127	130	60	29	30	33	36
	Cent.		117		47	20	20	21	24
VIII	Uncent.	142	137	138	115	145	118	83	38
	Cent.		130		80	68	54	44	25

*Influent to activated sludge units

higher percentage of the influent nitrogen was converted to ammonia. At no time did nitrate concentration in the filter effluent average more than about 0.7 mg/l. Effluents from the activated sludge pilot units, operated year-round at 25 C, always contained significant amounts of nitrate except under conditions of high loading and short detention time. Table 6-12 shows the changes in nitrogenous oxygen demand which can be achieved with tertiary activated sludge treatment.

Nitrogenous oxygen demand (NOD) was calculated assuming that all the Kjeldahl nitrogen would ultimately be converted to ammonia nitrogen. The oxygen demand of each milligram of ammonia-nitrogen was estimated at 4.33 mg O₂ (53). In addition, Table 6-12 indicates the improved NOD removals which could be achieved with improved solids removal, based on kjeldahl nitrogen concentration before and after centrifugation. As pointed out previously, the pilot settling basins did not achieve effective solids removal.

From these investigations, the following conclusions seem warranted:

1. the tertiary activated sludge process is capable of considerable reduction of the NOD in trickling filter effluent
2. the amount of NOD reduction is largely a function of detention time and BOD loading
3. in continuously operated units allowed to operate at pH levels below 7 the effect of pH on extent of nitrification does not appear to be as important as indicated by previous investigators
4. the effects of pH and alkalinity require further study so that the relative importance of each factor can be determined
5. to formulate a valid description of the relationship of MLSS concentration to nitrifying activity, a method of determining the relative number of nitrifiers in a given sample of sludge must be devised.

Further development and refinement of models such as those proposed by Downing and Knowles (54) and by Lijklema (55) would be facilitated if the numbers of nitrifiers in sludge could be accurately determined.

B. 3.0 GPM ACTIVATED SLUDGE PILOT PLANTS

1. Design

Because the results of the experiments with the 0.1 gpm activated sludge pilot plants were encouraging, three activated sludge pilot plants were constructed to permit operation on a reasonably large scale (3 gpm) to investigate further the effects of aerator detention and other parameters on performance. Each plant consisted of an aeration tank, final settling tank, sludge return pump, air compressor, automatic sampling system and all necessary control facilities.

TABLE 6-13

Design Data - 3 GPM Activated Sludge Pilot Plants

Parameter	Aerator 1	Aerator 2	Aerator 3	Settling Tanks
Return Sludge Flow (GPM)				2.25
Diameter	24"	32"	48"	48"
Height of Conical Section	36"	48"	72"	72"
Height of Water in Cylindrical Section	60"	48"	24"	21"
Free Board	20"	20"	20"	23"
Total Heights of Tank	116"	116"	116"	116"
Total Volume (ft ³)	18.8	29.8	50.3	47.2
Total Volume (Gal)	141	224	376	353
Influent Flow (GPM)	3.0	3.0	3.0	
Detention Time (Hrs.)	0.8	1.25	2.1	1.96

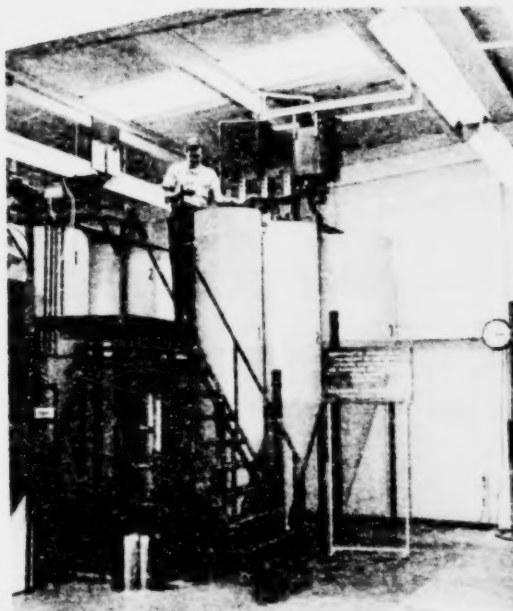


FIGURE 6-16. PHOTOGRAPH OF LARGE ACTIVATED
SLUDGE PILOTS. AERATORS TO RIGHT
SETTLING TANKS AT LEFT.

To prevent accumulation of solids in the totally mixed aeration tanks, the tanks were constructed with conical bottoms, with air introduced at the bottom tip of the cone. Because it was desired to avoid mechanical sludge removal equipment, the final settling tanks also were constructed with conical bottoms, having side slopes of 3:1 (vertical to horizontal) to insure satisfactory movement of sludge to an outlet located at the tip of the cone.

At this scale of operation, it is impossible to produce identical hydrodynamic effects in final settling tanks of different sizes. Because the variables of prime interest included aerator detention times and various loading parameters, not final settling, it was decided that the three plants would be operated at the same hydraulic flow, using identical final settling tanks to avoid the hydrodynamics problem. Different detention times and loadings were obtained by using three different size aeration tanks. These did represent valid hydrodynamic equivalents because they were totally mixed, making size and shape relatively unimportant. Design characteristics of all tanks in the pilot plants are summarized in Table 6-13 and the plants are shown in Figure 6-16.

The total influent flow for all three plants was pumped from the effluent of a Chapel Hill trickling filter, using a variable-speed rubber impeller pump. This flow was divided continuously into three identical portions by using a specially-designed rotating flow-splitter. Each plant was equipped with a rotameter for measuring air flow. Additions of air were regulated to maintain dissolved oxygen in the aeration tank at all times equal to or greater than 1.0 mg/l. Return sludge was pumped continuously from the final settling tanks to aeration tanks by means of variable-speed rubber impeller pumps.

2. Plant Operation

The influent to these plants consisted of effluent from a trickling filter in the Chapel Hill Treatment Plant. Because the full-scale plant was operated throughout this project on an experimental basis, with periodic changes in recirculation ratio and rate of flow application, influent quality to the activated sludge pilot plants varied in response to changes in the main plant operation as well as the usual seasonal and other variations in the process.

Unlike the smaller activated sludge studies reported earlier, there was no effort to control temperature in the 3 gpm activated sludge plants. Accordingly, temperature in the aerators varied with changes in temperature of the trickling filter effluent. Of course, because these units were located in a heated building, there was little or no further change after introduction into the aeration tanks, as might have been expected if the plants had been operated outside in an exposed location.

Dissolved oxygen in the aeration tank was maintained in the range of 1.0-4.0 mg/l at all times. Sludge was wasted three times a day from the system.

Samples of influent to the units and overflow from each settling tank were collected for one day three times per week. Each composite was collected automatically by pumping equal volumes, at 30-minute intervals, into refrigerated containers. The sampling system was designed to purge the sample lines automatically before diverting a portion of flow into the sample container.

Analyses were conducted for BOD₅, total organic carbon (TOC), suspended solids (SS), volatile suspended solids (VSS), Kjeldahl nitrogen (Kjeld-N), ammonia nitrogen (NH₃-N), oxidized nitrogen (NO₂-N + NO₃-N), total phosphorus (TP), total inorganic phosphorus (TIP), turbidity (JTU), and pH. Grab samples of mixed liquor and return sludge were analyzed for suspended solids (MLSS and RSSS) and volatile suspended solids (MLSS and RSVSS). Daily measurements were made of dissolved oxygen (oxygen probe method), temperature, influent flow rate, return sludge flow rate, and settleable mixed liquor solids.

Because results obtained from the smaller activated sludge units had indicated the importance of solids carryover from the final tanks, composite samples from the larger plants were analyzed "as is" and centrifuged (2200 g, International Model UV Centrifuge) for BOD, TOC and Kjeld-N.

3. Results and Discussion

The original intent was to conduct studies at various BOD/solids loadings by adjusting the rate of sludge wasting. It was determined that wasting MLSS on a predetermined pattern would not control the solids adequately because MLSS varied markedly even during extended periods in which daily wasting was maintained at a constant rate. Daily calculation of the proper amount of sludge to waste to maintain a specified MLSS was impractical because a very large, but unknown, proportion of all solids in the system at any given time was in the settling tank, which was larger than the aerator.

Statistical analyses of preliminary data indicated no significant correlation between BOD, solids loading and performance. The only clear correlation established was between detention time in the aerator and performance. An exception was that the degree of nitrification (ammonia removal during treatment), increased with aeration time and concentration of MLSS, when influent BOD was less than 40 mg/l (Figure 6-17). This also had been observed in data from the 0.1 gpm activated sludge units, described earlier.

Because of the difficulty in maintaining constant MLSS, variation in solids during any given experimental period was found to be about as great as that between successive experimental periods. Examination of data for the different chronological periods of experimentation indicated that the most reasonable approach appeared to be to combine results for the entire period from July 1, 1971 through January 27, 1972.

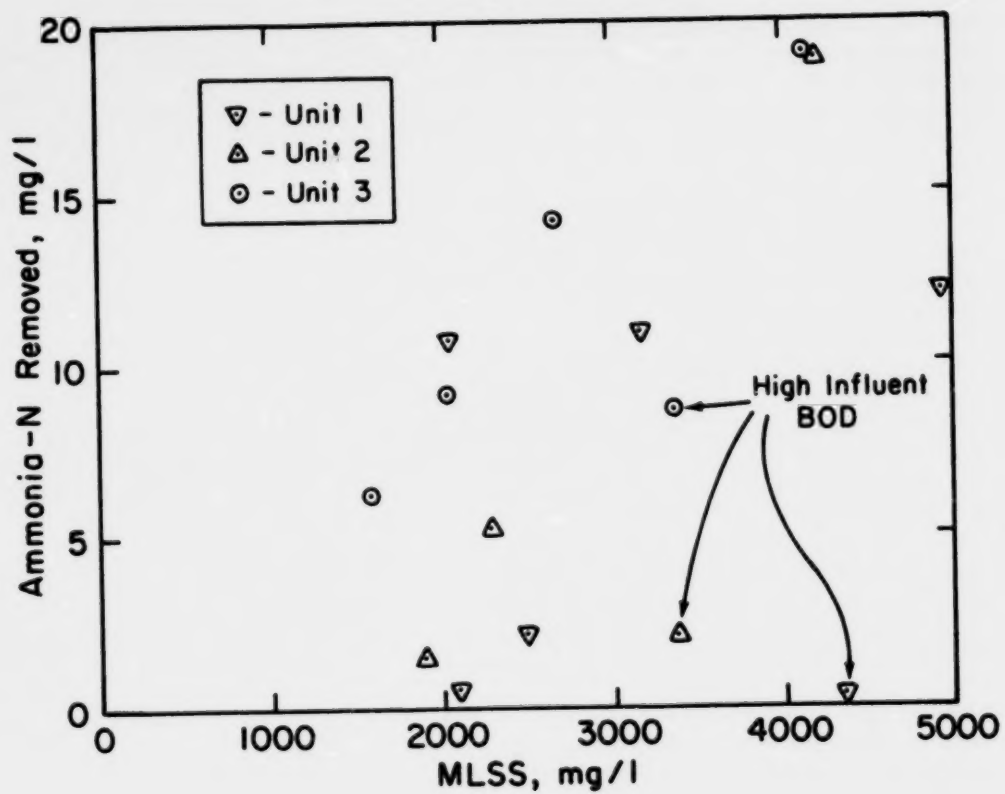


FIGURE 6-17. AMMONIA REMOVAL AS A FUNCTION MIXED LIQUOR SUSPENDED SOLIDS.

Mixed liquor suspended solids tended to decrease with increasing detention time in the aeration system. The sludge volume index for all units was within a range generally considered to be acceptable (56), but as pointed out by Dick and Vesilind (57) this really is not a very good performance criterion. Aerator loadings (g BOD/g MLSS/day) fell within ranges generally representative of many plants in practice (58).

Table 6-14 summarizes characteristics of untreated sewage, trickling filter effluent, and effluent from each of the three activated sludge pilot units. Based on data for BOD and TOC in Table 6-14 and Figure 6-18, the activated sludge units gave significant but not radical improvement in plant performance beyond the trickling filters. BOD removal increased by 3-8% and TOC removal increased by 5-7%. Suspended solids removal were not improved by addition of activated sludge to the main plant, although turbidity was significantly better. Effluent suspended solids reflect the same poor quality of settling observed earlier with the smaller activated sludge pilot units.

Figures for soluble BOD and soluble TOC show the type of performance which could be anticipated with removal of fine solids from the plant effluent. Removal of suspended material, perhaps by filtration, from the trickling filter effluent would increase overall performance from 78% to 88% BOD removal, approximately 50% removal of BOD in the current plant effluent. Addition of activated sludge unit including removal of solids, would give substantial further improvement to produce overall performance of 93-94% BOD removal. Although TOC removals are somewhat lower, as expected, they show the same types of trends observed for the BOD data.

The most striking change in performance attending addition of the activated sludge system is reflected in large decreases in Kjeld-N. This can be attributed to more complete nitrification in the activated sludge units. The nitrogenous oxygen demand (NOD) of effluent from the main plant averaged 121 mg/l, a figure which was reduced in the activated sludge effluents to 66, 54, and 41 mg/l, with increasing detention times. This produces a very significant improvement in removal of oxygen demand, when considering both carbonaceous and nitrogenous materials (Figure 6-19).

Further, it may be noted that addition of the activated sludge units resulted in substantial decrease in total nitrogen content of the effluents, presumably because of denitrification in the final settling tanks. Gas formation was observed in those tanks frequently and this could have contributed to relatively poor solids removal by those units.

The data suggest that addition of this activated sludge modification, with detention periods of 0.9-2.3 hrs, could improve BOD removal by a trickling filter plant, but only slightly unless additional steps are taken to remove suspended materials from the effluent. Without solids removals it appears that addition of the activated sludge would not be

TABLE 6-14
PERFORMANCE OF CHAPEL HILL TRICKLING FILTER PLANT
AND
3 GPM ACTIVATED SLUDGE PILOT PLANTS*

Parameter	Chapel Hill Plant		Activated Sludge Pilot Plants		
	Influent	Effluent	Effluent #1	Effluent #2	Effluent #3
BOD ₅	159 ± 35	35 ± 20	25 ± 14	30 ± 17	22 ± 14
Soluble BOD ₅		19 ± 11	12 ± 11	10 ± 13	8 ± 11
Ultimate BOD (BOD ₅ + MOD)**	302	156	91	84	63
TOC	137 ± 36	41 ± 24	33 ± 10	35 ± 11	32 ± 12
Soluble TOC		33 ± 7	23 ± 5	23 ± 6	18 ± 5
Suspended Solids	157 ± 38	32 ± 18	34 ± 23	36 ± 19	37 ± 26
Turbidity	71 ± 10	28 ± 9	14 ± 5	16 ± 6	15 ± 8
NH ₃ -N	22 ± 4.2	21 ± 5.2	12.3 ± 5	10.0 ± 6	6.7 ± 5
Kjeld-N	33 ± 8.5	28 ± 7.7	15.2 ± 5	12.6 ± 5	9.5 ± 4
NO ₂ + NO ₃ -N	0.9 ± 3.2	1.2 ± 3.2	4.3 ± 2	6.7 ± 3	11.6 ± 4
Soluble Kjeld-N		14.3 ± 4.7	13.8 ± 4.0	12.1 ± 4.0	8.2 ± 3.8
pH	7.1 ± 0.2	7.1 ± 0.2	7.0 ± 0.2	6.8 ± 0.3	6.5 ± 0.4
Total P	10.2 ± 1.8	9.0 ± 1.4	8.8 ± 1.3	8.8 ± 1.6	8.6 ± 1.5
Total Inorganic P	9.1 ± 1.4	8.1 ± 1.4	7.6 ± 1.0	7.6 ± 1.0	7.6 ± 1.0

*All values in mg/l except pH and turbidity

**Calculated as 4.33 (Kjeld-N) after Wazernak and Gannon (53).

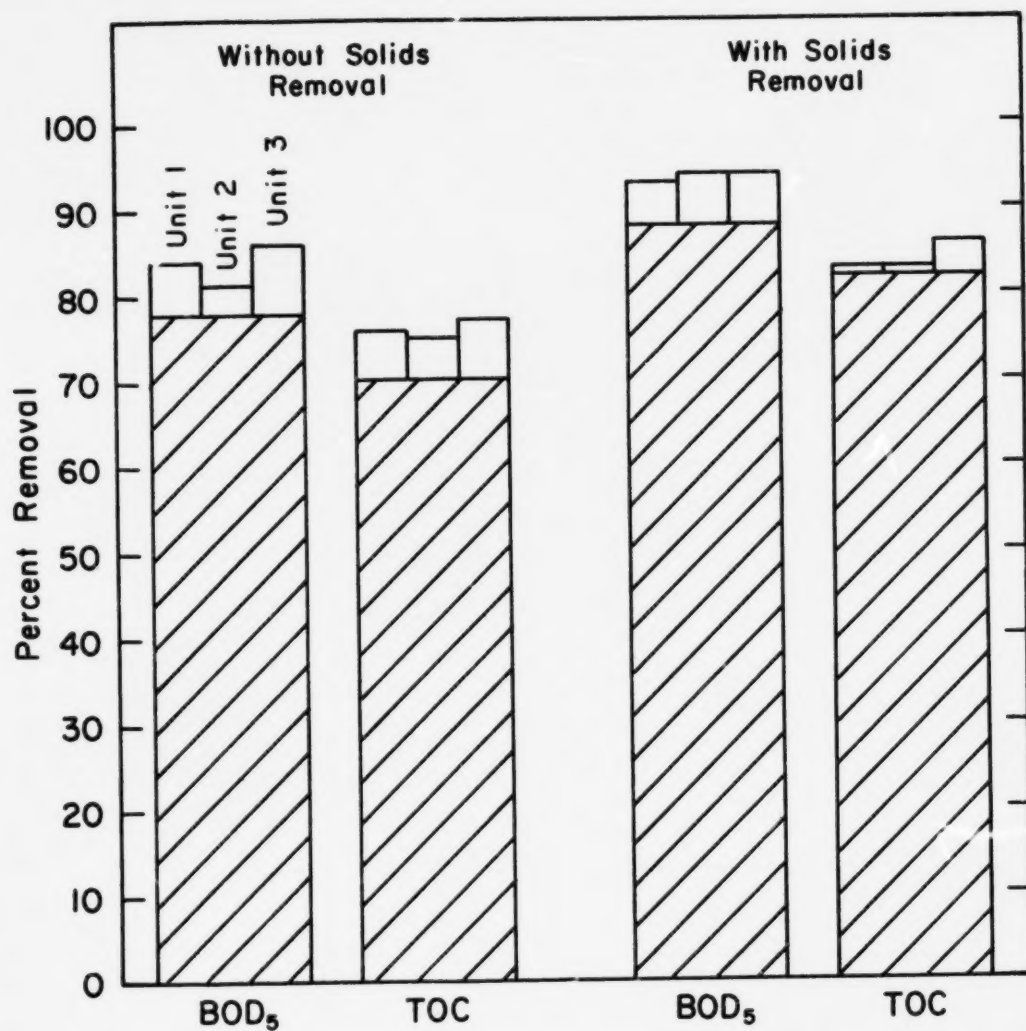


FIGURE 6-18. AVERAGE PER CENT BOD REMOVAL OF BOD₅ AND ORGANIC CARBON WITH AND WITHOUT SUBSEQUENT SOLIDS REMOVAL FOR THE MAIN PLANT (SHADED) AND THE ADDITIONAL REMOVAL IN THE ACTIVATED SLUDGE PILOTS (OPEN).

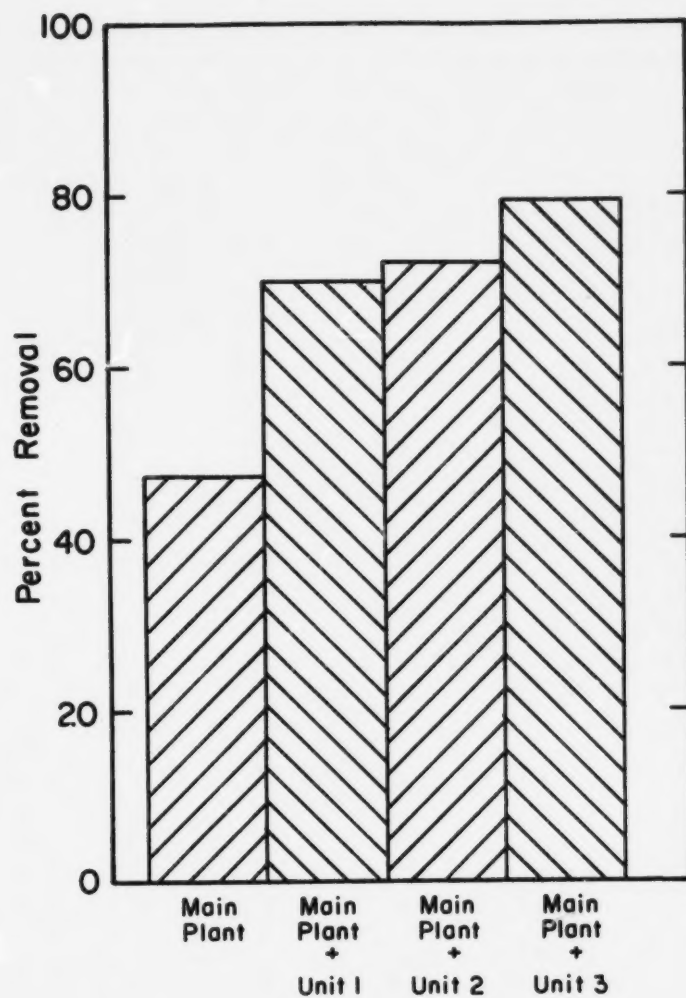


FIGURE 6-19. PERCENT REMOVAL OF ULTIMATE BOD *
IN THE MAIN PLANT AND MAIN PLANT
WITH ACTIVATED SLUDGE PILOT PLANTS.

*CALCULATED AS $BOD_5 + 4.33$ (KJELD-N)
AFTER WEZERNAK AND GANNON (53).

advantageous unless the increase in nitrification would provide sufficient justification, which would be unlikely in most instances.

Combination of the activated sludge modification with filtration or other treatment appropriate for removing suspended material would produce substantially improved performance, with BOD removals exceeding 90%. One appropriate means for suspended solids removal would be in conjunction with chemical precipitation-flocculation for phosphorus removal. In this instance, effluent quality should be excellent, with potential for very low BOD, substantial nitrification and removal of most phosphorus.

Section VII

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Section VII

REFERENCES

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APPENDIX A

DATA LISTING FOR MAIN PLANT

NOVEMBER, 1969 TO JANUARY, 1970

CONTENTS

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Description of Data Listing Format

All of the routine data collected on the Chapel Hill Main Plant from November 19, 1969 to January 24, 1972 are listed in this appendix. The data list is in seven sections. Each section lists a different group of variables for the entire period of data collection. The date, day of week, and sample types are repeated in each section. Blanks in the tables indicate that the particular parameter was not determined on that date with the given sample type.

As discussed in Section V, the main plant consists of two parallel units, Side 1 and Side 2. The numbers in the variable labels refer to the side of the plant. Samples were routinely collected at seven points of flow. These were influent (labelled INF), primary tank effluent (labelled P-1 or P-2), trickling filter effluent (labelled F-1 or F-2), and final settling tank effluent (labelled S-1 or S-2).

The variable "Samp Type" refers to the type of sample (composite, grab, etc.) on which the analyses in a given line of data were made. The description of the code is in the next section. On many dates two different types of samples were collected. These dates are listed twice with the values of each variable appearing on the line with the appropriate sample type. Hydraulic data is listed for each line in the file. Thus, if the date appears twice, the hydraulic data will also appear twice.

Variable Definitions and Units

1. Samp Type = Sample type (see next section for code)
2. Total Flow = Flow in mgd into the head end of the plant
3. Max. Flow = Maximum total plant flow in mgd during the day
4. Min. Flow = Minimum total plant flow in mgd during the day
5. FRCT = Fraction of total flow passed to indicated side
6. Flow = Flow in mgd to indicated side (FRCT x Total Flow)
7. RCRC = Recirculation flow (mgd) on indicated side
8. RCRC Ratio = Recirculation ratio on indicated side (RCRC/Flow)
9. Temp. = Influent temperature (°C)
10. HYD Load = Hydraulic load (mgad) on trickling filter on indicated side (Flow + RCRC/Filter area)
11. BOD Load = BOD load (lbs/1000 ft³/day) on trickling filter on indicated side
(Flow x Inf BOD x 8.34/volume in ft³ x 10⁻³)
12. Org C Load = Organic carbon load (lbs/1000 ft³/day) on trickling filter on indicated side
(Flow x Inf Org C x 8.34/volume in ft³ x 10⁻³)
13. BOD EFF = BOD removal efficiency (%) on indicated side
$$100 \left(\frac{\text{Inf BOD} - \text{S BOD}}{\text{Inf BOD}} \right)$$

14. SS EFF = Suspended solids removal efficiency (%) on indicated side

$$100 \left(\frac{\text{Inf SS} - \text{S SS}}{\text{Inf SS}} \right)$$
15. Org C EFF = Organic carbon removal efficiency (%) on indicated side

$$100 \left(\frac{\text{Inf Org C} - \text{S Org C}}{\text{Inf Org C}} \right)$$
16. BOD = Five day 20° C biochemical oxygen demand (mg/l) at indicated point
17. SS = Suspended solids (mg/l) at indicated point
18. Org C = Total organic carbon (mg C/l) at indicated point
19. NO₂ = Nitrite (mgN/l) at indicated point
20. NO₃ = Nitrate (mgN/l) at indicated point
21. NH₃ = Ammonia (mgN/l) at indicated point
22. KJELD N = Total Kjeldahl nitrogen (mgN/l) at indicated point
23. Totl In P = Total inorganic phosphorus (mgP/l) at indicated point
24. Totl P = Total phosphorus (mgP/l) at indicated point
25. Turb = Turbidity (JTU) at indicated point
26. pH = pH at indicated point

Code Definitions for Sample Type Variable

<u>Code</u>	<u>Definition</u>
missing or 99	= No chemistry sample taken
04	= 2-day time proportional composite
06	= 1-day time proportional composite
07	= 3-day time proportional composite
10	= 2-part composite of 1-day time proportional composites
11	= 12-hour time proportional composite
12	= 3-part composite of 1-day time - proportional composites
13	= 1-day time proportional composite with BOD ₆
15	= 1-day flow proportional composite

Contents of Data Files

Data Listing of Total Flow, Maximum Flow, Minimum Flow, Fraction to Side 1, Fraction to Side 2, Flow Side 1, Flow Side 2, Recirculation Flow Side 1, Recirculation Flow Side 2, Recirculation Ratio Side 1, Recirculation Ratio Side 2, Influent Temperature, Hydraulic Load Side 1, Hydraulic Load Side 2, and BOD Load Side 1

Data Listing of BOD Load Side 2, Organic Carbon Load Side 1, Organic Carbon Load Side 2, BOD Removal Side 1, BOD Removal Side 2, Suspended Solids Removal Side 1, Suspended Solids Removal Side 2, Organic Carbon Removal Side 1, Organic Carbon Removal Side 2, Influent BOD, P-1 BOD, F-1 BOD, S-1 BOD, P-2 BOD, F-2 BOD, S-2 BOD

Data Listing of Influent Suspended Solids, P-1 Suspended Solids, F-1 Suspended Solids, S-1 Suspended Solids, P-2 Suspended Solids, F-2 Suspended Solids, S-2 Suspended Solids, Influent Organic Carbon, P-1 Organic Carbon, F-1 Organic Carbon, S-1 Organic Carbon, P-2 Organic Carbon, F-2 Organic Carbon, S-2 Organic Carbon, Influent Nitrite, P-1 Nitrite, and F-1 Nitrite

Data Listing of S-1 Nitrite, P-2 Nitrite, F-2 Nitrite, S-2 Nitrite, Influent Nitrate, P-1 Nitrate, F-1 Nitrate, S-1 Nitrate, P-2 Nitrate, F-2 Nitrate, S-2 Nitrate, Influent Ammonia, P-1 Ammonia, F-1 Ammonia, S-1 Ammonia

Data Listing of P-2 Ammonia, S-2 Ammonia, Influent Kjeldahl, P-1 Kjeldahl, F-1 Kjeldahl, S-1 Kjeldahl, P-2 Kjeldahl, F-2 Kjeldahl, S-2 Kjeldahl, Influent Total Inorganic Phosphorus, P-1 Total Inorganic Phosphorus, F-1 Total Inorganic Phosphorus, S-1 Total Inorganic Phosphorus and P-2 Total Inorganic Phosphorus

Data Listing of F-2 Total Inorganic Phosphorus, S-2 Total Inorganic Phosphorus, Influent Total Phosphorus, P-1 Total Phosphorus, F-1 Total Phosphorus, S-1 Total Phosphorus, P-2 Total Phosphorus, F-2 Total Phosphorus, S-2 Total Phosphorus, Influent Turbidity, P-1 Turbidity, F-1 Turbidity, S-1 Turbidity, P-2 Turbidity, F-2 Turbidity, and S-2 Turbidity

Data Listing of Influent pH, P-1 pH, F-1 pH, S-1 pH, P-2 pH, F-1 pH, and S-2 pH

Date Obs	Day of Week	Samp Type	Total Flow	Max Flow	Min Flow	FPCT Side 1	FPCT Side 2	Flow Side 1	Flow Side 2	RCBC Side 1	RCBC Side 2	RCBC Ratio 1	RCBC Ratio 2	Temp	HYD Load 1	HYD Load 2	BOD Load 1
NOV 19 69	WED	6	2.370	3.6	0.7	0.50	0.50	1.185	1.185	3.20	3.20	2.70	2.70	25.3	17.0	17.0	--
NOV 19 69	WED	4	2.370	3.6	0.7	0.50	0.50	1.185	1.185	3.20	3.20	2.70	2.70	25.3	17.0	17.0	38.8
NOV 20 69	THU	6	2.310	3.5	0.7	0.50	0.50	1.165	1.165	3.20	3.20	2.75	2.75	18.0	16.9	16.9	38.1
NOV 20 69	THU	6	2.310	3.5	0.7	0.50	0.50	1.165	1.165	3.20	3.20	2.75	2.75	18.0	16.9	16.9	38.1
NOV 21 69	FRI	6	2.310	3.5	0.7	0.50	0.50	1.155	1.155	3.20	3.20	2.77	2.77	19.5	16.9	16.9	25.5
NOV 21 69	FRI	7	2.310	3.5	0.7	0.50	0.50	1.155	1.155	3.20	3.20	2.77	2.77	19.5	16.9	16.9	25.5
NOV 22 69	SAT	4	1.950	3.7	0.6	0.50	0.50	0.975	0.975	3.20	3.20	3.28	3.28	18.5	16.2	16.2	21.5
NOV 22 69	SAT	7	1.950	3.7	0.6	0.50	0.50	0.975	0.975	3.20	3.20	3.28	3.28	18.5	16.2	16.2	21.5
NOV 23 69	SUN	4	1.870	3.1	0.6	0.50	0.50	0.935	0.935	3.20	3.20	3.42	3.42	16.0	16.0	16.0	20.6
NOV 23 69	SUN	7	1.870	3.1	0.6	0.50	0.50	0.935	0.935	3.20	3.20	3.42	3.42	16.0	16.0	16.0	20.6
NOV 24 69	MON	6	2.270	3.5	0.7	0.50	0.50	1.135	1.135	3.20	3.20	2.82	2.82	19.4	16.8	16.8	34.0
NOV 24 69	MON	4	2.270	3.5	0.7	0.50	0.50	1.135	1.135	3.20	3.20	2.82	2.82	19.4	16.8	16.8	34.0
NOV 25 69	TUE	6	2.140	3.5	0.7	0.50	0.50	1.090	1.090	3.20	3.20	2.94	2.94	19.3	16.6	16.6	32.6
NOV 25 69	TUE	4	2.140	3.5	0.7	0.50	0.50	1.090	1.090	3.20	3.20	2.94	2.94	19.3	16.6	16.6	32.6
NOV 26 69	WED	6	1.260	2.1	0.6	0.50	0.50	0.685	0.685	3.20	3.20	4.67	4.67	15.1	15.1	15.1	14.6
NOV 26 69	WED	4	1.260	2.1	0.6	0.50	0.50	0.685	0.685	3.20	3.20	4.67	4.67	15.1	15.1	15.1	14.6
NOV 27 69	THU	6	1.370	2.5	0.6	0.50	0.50	0.785	0.785	3.20	3.20	4.85	4.85	15.4	15.4	15.4	17.3
NOV 27 69	THU	4	1.370	2.5	0.6	0.50	0.50	0.785	0.785	3.20	3.20	4.85	4.85	15.4	15.4	15.4	17.3
NOV 28 69	FRI	6	1.570	2.6	0.6	0.50	0.50	1.100	1.100	3.20	3.20	2.91	2.91	18.0	16.7	16.7	26.0
NOV 28 69	FRI	4	1.570	2.6	0.6	0.50	0.50	1.100	1.100	3.20	3.20	2.91	2.91	18.0	16.7	16.7	26.0
NOV 29 69	SAT	6	2.200	3.4	0.6	0.50	0.50	1.125	1.125	3.20	3.20	2.84	2.84	18.5	16.8	16.8	26.6
NOV 29 69	SAT	4	2.200	3.4	0.6	0.50	0.50	1.125	1.125	3.20	3.20	2.84	2.84	18.5	16.8	16.8	26.6
DEC 1 69	MON	6	2.250	3.5	0.6	0.50	0.50	1.130	1.130	3.20	3.20	2.83	2.83	18.8	16.8	16.8	26.7
DEC 1 69	MON	4	2.250	3.5	0.6	0.50	0.50	1.130	1.130	3.20	3.20	2.83	2.83	18.8	16.8	16.8	26.7
DEC 2 69	TUE	6	2.260	3.5	0.6	0.50	0.50	1.135	1.135	3.20	3.20	2.82	2.82	18.6	16.8	16.8	26.9
DEC 2 69	TUE	4	2.260	3.5	0.6	0.50	0.50	1.135	1.135	3.20	3.20	2.82	2.82	18.6	16.8	16.8	26.9
DEC 3 69	WED	6	2.270	3.5	0.7	0.50	0.50	1.095	1.095	3.20	3.20	2.92	2.92	18.0	16.6	16.6	26.6
DEC 3 69	WED	4	2.270	3.5	0.7	0.50	0.50	1.095	1.095	3.20	3.20	2.92	2.92	18.0	16.6	16.6	26.6
DEC 4 69	THU	6	2.170	3.5	0.6	0.50	0.50	0.940	0.940	3.20	3.20	3.40	3.40	17.0	16.0	16.0	26.0
DEC 4 69	THU	4	2.170	3.5	0.6	0.50	0.50	0.940	0.940	3.20	3.20	3.40	3.40	17.0	16.0	16.0	26.0
DEC 5 69	FRI	7	2.040	3.3	0.5	0.50	0.50	1.045	1.045	3.20	3.20	3.14	3.14	16.4	16.4	16.4	40.2
DEC 5 69	FRI	4	2.040	3.3	0.5	0.50	0.50	1.045	1.045	3.20	3.20	3.14	3.14	16.4	16.4	16.4	40.2
DEC 6 69	SAT	7	2.040	3.3	0.5	0.50	0.50	1.045	1.045	3.20	3.20	3.06	3.06	17.9	16.5	16.5	43.9
DEC 6 69	SAT	4	2.040	3.3	0.5	0.50	0.50	1.045	1.045	3.20	3.20	3.06	3.06	17.9	16.5	16.5	43.9
DEC 7 69	SUN	6	2.090	3.5	0.6	0.50	0.50	1.180	1.180	3.20	3.20	2.81	2.81	18.1	16.8	16.8	41.0
DEC 7 69	SUN	4	2.090	3.5	0.6	0.50	0.50	1.180	1.180	3.20	3.20	2.81	2.81	18.1	16.8	16.8	41.0
DEC 8 69	MON	6	2.240	4.1	0.7	0.50	0.50	1.445	1.445	3.20	3.20	2.21	2.21	17.5	18.0	18.0	41.0
DEC 8 69	MON	4	2.240	4.1	0.7	0.50	0.50	1.445	1.445	3.20	3.20	2.21	2.21	17.5	18.0	18.0	41.0
DEC 9 69	TUE	6	2.360	3.6	0.6	0.50	0.50	1.255	1.255	3.20	3.20	2.79	2.79	17.5	18.4	17.3	35.6
DEC 9 69	TUE	4	2.360	3.6	0.6	0.50	0.50	1.255	1.255	3.20	3.20	2.79	2.79	17.5	18.4	17.3	35.6
DEC 10 69	WED	6	2.510	3.7	0.6	0.50	0.50	1.180	1.180	3.20	3.20	2.88	2.88	17.7	17.8	17.0	28.5
DEC 10 69	WED	4	2.510	3.7	0.6	0.50	0.50	1.180	1.180	3.20	3.20	2.88	2.88	17.7	17.8	17.0	28.5
DEC 11 69	THU	6	2.360	3.6	0.6	0.50	0.50	1.180	1.180	3.20	3.20	2.88	2.88	17.7	17.8	17.0	25.0
DEC 11 69	THU	4	2.360	3.6	0.6	0.50	0.50	1.180	1.180	3.20	3.20	2.88	2.88	17.7	17.8	17.0	25.0
DEC 12 69	FRI	6	2.070	3.5	0.7	0.50	0.50	1.035	1.035	3.20	3.20	3.29	3.29	17.2	16.4	16.4	26.0
DEC 12 69	FRI	4	2.070	3.5	0.7	0.50	0.50	1.035	1.035	3.20	3.20	3.29	3.29	17.2	16.4	16.4	26.0
DEC 13 69	SAT	7	2.150	3.1	0.6	0.50	0.50	1.075	1.075	3.20	3.20	2.92	2.92	17.3	16.6	16.6	39.8
DEC 13 69	SAT	4	2.150	3.1	0.6	0.50	0.50	1.075	1.075	3.20	3.20	2.92	2.92	17.3	16.6	16.6	39.8
DEC 14 69	SUN	7	2.330	3.7	0.6	0.50	0.50	1.165	1.165	3.20	3.20	2.92	2.92	17.1	17.7	16.9	35.6
DEC 14 69	SUN	4	2.330	3.7	0.6	0.50	0.50	1.165	1.165	3.20	3.20	2.92	2.92	17.1	17.7	16.9	35.6
DEC 15 69	MON	6	2.230	3.6	0.6	0.50	0.50	1.115	1.115	3.20	3.20	1.35	1.35	17.0	10.1	10.1	38.0
DEC 15 69	MON	4	2.230	3.6	0.6	0.50	0.50	1.115	1.115	3.20	3.20	1.35	1.35	17.0	10.1	10.1	38.0
DEC 16 69	TUE	6	2.150	3.6	0.6	0.50	0.50	1.075	1.075	3.20	3.20	1.30	1.30	17.1	9.6	10.0	38.0
DEC 16 69	TUE	4	2.150	3.6	0.6	0.50	0.50	1.075	1.075	3.20	3.20	1.30	1.30	17.1	9.6	10.0	38.0
DEC 17 69	WED	6	2.150	3.6	0.6	0.50	0.50	1.075	1.075	3.20	3.20	1.30	1.30	17.1	9.6	10.0	38.0
DEC 17 69	WED	4	2.150	3.6	0.6	0.50	0.50	1.075	1.075	3.20	3.20	1.30	1.30	17.1	9.6	10.0	38.0

Date of Obsv	Day of Week	Temp	Total Flow	Max Flow	Min Flow	PFCT Side 1	PFCT Side 2	Flow Side 1	Flow Side 2	RCRC Side 1	RCRC Side 2	RCRC Ratio 1	RCRC Ratio 2	Temp	HYD Load 1	HYD Load 2	BCD Load 1
DEC 18 69	THU	6	1.870	3.4	0.6	0.50	0.50	0.935	0.935	1.40	1.50	1.50	1.60	16.2	9.1	9.4	---
DEC 19 69	THU	4	1.870	3.4	0.6	0.50	0.50	0.935	0.935	1.40	1.50	1.50	1.60	16.2	9.1	9.4	---
DEC 20 69	FRI		1.600	3.0	0.6	0.50	0.50	0.800	0.800	1.40	1.50	1.50	1.88	15.5	8.5	8.9	---
DEC 21 69	SAT		1.380	2.2	0.5	0.50	0.50	0.690	0.690	1.40	1.50	2.03	2.17		8.1	8.5	---
DEC 22 69	SUN		1.550	2.4	1.1	0.50	0.50	0.775	0.775	1.40	1.50	1.81	1.94		8.4	8.8	---
DEC 23 69	MON		1.820	3.4	0.6	0.50	0.50	0.960	0.960	1.40	1.50	1.86	1.56		9.1	9.5	---
DEC 24 69	TUE		1.510	2.7	0.6	0.50	0.50	0.755	0.755	1.40	1.50	1.85	1.99		8.4	8.7	---
DEC 25 69	WED		1.320	2.5	0.4	0.50	0.50	0.660	0.660	1.40	1.50	2.12	2.27		8.0	8.4	---
DEC 26 69	THU		1.480	2.5	0.5	0.50	0.50	0.740	0.740	1.40	1.50	1.89	2.03		8.3	8.7	---
DEC 27 69	FRI		1.930	2.9	0.4	0.50	0.50	0.965	0.965	1.40	1.50	1.95	1.55		9.2	9.6	---
DEC 28 69	SAT		1.460	2.5	0.6	0.50	0.50	0.730	0.730	1.40	1.50	1.92	2.05		8.3	8.6	---
DEC 29 69	SUN		1.320	2.0	0.6	0.50	0.50	0.660	0.660	1.40	1.50	2.12	2.27		8.3	8.6	---
DEC 30 69	MON	6	1.580	2.8	0.6	0.50	0.50	0.790	0.790	1.40	1.50	1.77	1.90		8.5	8.9	30.4
DEC 31 69	TUE	4	1.580	2.8	0.6	0.50	0.50	0.785	0.785	1.40	1.50	1.78	1.91		8.5	8.9	30.2
JAN 1 70	WED		1.570	2.6	0.6	0.50	0.50	0.785	0.785	1.40	1.50	1.78	1.91		8.5	8.9	---
JAN 2 70	THU		1.890	2.2	0.6	0.50	0.50	0.945	0.945	1.40	1.50	1.68	1.59		9.1	9.5	---
JAN 3 70	FRI		1.450	7.5	0.6	0.50	0.50	0.725	0.725	1.40	1.50	1.93	2.07		8.2	8.6	---
JAN 4 70	SAT		2.210	3.3	0.6	0.50	0.50	1.105	1.105	1.40	1.50	1.27	1.36		9.7	10.1	---
JAN 5 70	SUN		2.410	3.4	0.9	0.50	0.50	1.205	1.205	1.40	1.50	1.16	1.24		10.1	10.5	---
JAN 6 70	MON		2.420	3.5	0.7	0.50	0.50	1.210	1.210	1.40	1.50	1.16	1.24		10.1	10.5	---
JAN 7 70	TUE		2.177	3.6	0.7	0.50	0.50	1.088	1.088	1.40	1.50	1.24	1.38		9.6	10.2	---
JAN 8 70	WED		2.272	3.3	0.7	0.50	0.50	1.136	1.136	1.40	1.50	1.23	1.32		9.8	10.2	---
JAN 9 70	THU		2.229	3.4	0.5	0.50	0.50	1.019	1.019	1.40	1.50	1.26	1.00		9.4	9.7	---
JAN 10 70	FRI		2.038	3.5	0.5	0.50	0.50	1.114	1.114	1.40	1.50	1.17	1.26		10.1	10.4	---
JAN 11 70	SAT		2.229	3.4	0.7	0.50	0.50	1.194	1.194	1.40	1.50	1.19	1.28		10.0	10.4	---
JAN 12 70	SUN		2.369	3.6	0.6	0.50	0.50	1.174	1.174	1.40	1.50	1.24	1.33		9.8	10.2	---
JAN 13 70	MON		2.251	3.3	0.6	0.50	0.50	1.125	1.125	1.40	1.50	1.26	1.35		9.7	10.1	---
JAN 14 70	TUE		2.217	3.4	0.6	0.50	0.50	1.108	1.108	1.40	1.50	1.26	1.35		9.7	10.1	---
JAN 15 70	WED		2.201	3.5	0.6	0.50	0.50	1.100	1.100	1.40	1.50	1.27	1.00		9.7	10.1	---
JAN 16 70	THU		2.079	3.5	0.7	0.50	0.50	1.039	1.039	1.40	1.50	1.35	1.00		9.5	9.9	33.3
JAN 17 70	FRI	4	2.055	3.3	0.8	0.50	0.50	1.027	1.027	1.40	1.50	1.36	1.00		9.4	9.8	32.9
JAN 18 70	SAT	4	2.374	3.4	0.7	0.50	0.50	1.187	1.187	1.40	1.50	1.51	1.00		16.2	16.2	38.0
JAN 19 70	SUN	4	2.362	3.4	0.7	0.50	0.50	1.151	1.151	3.00	3.00	2.51	2.53		16.1	16.1	36.9
JAN 20 70	MON	4	2.276	3.3	0.7	0.50	0.50	1.138	1.138	3.00	4.50	2.64	3.95		16.0	21.9	49.8
JAN 21 70	TUE	4	2.290	3.4	0.7	0.50	0.50	1.145	1.145	3.00	4.50	2.62	3.93		16.1	21.9	50.1
JAN 22 70	WED	4	2.161	3.1	0.6	0.50	0.50	1.080	1.080	3.00	4.50	2.78	4.16		15.8	21.6	31.2
JAN 23 70	THU	7	1.951	3.1	0.6	0.50	0.50	0.975	0.975	3.00	4.50	3.08	4.61		15.4	21.2	28.2
JAN 24 70	FRI	7	1.807	2.9	0.6	0.50	0.50	0.903	0.903	3.00	4.50	3.32	4.98		15.1	20.9	26.1
JAN 25 70	SAT	4	2.155	3.4	0.6	0.50	0.50	1.077	1.077	3.00	4.50	2.78	4.18		15.8	21.6	---
JAN 26 70	SUN	4	2.044	3.2	0.7	0.50	0.50	1.022	1.022	3.00	4.50	2.94	2.94	14.0	15.6	15.6	---
JAN 27 70	MON	4	1.901	3.1	0.7	0.50	0.50	0.950	0.950	3.00	3.00	3.16	3.16	14.0	15.3	15.3	---
JAN 28 70	TUE	4	1.978	3.1	0.6	0.50	0.50	0.939	0.939	3.00	4.50	2.89	4.33	14.0	15.7	15.7	---
JAN 29 70	WED	4	1.957	3.0	0.6	0.50	0.50	0.978	0.978	3.00	3.00	3.07	3.07	15.4	15.4	15.4	---
JAN 30 70	THU	7	1.770	2.6	0.6	0.50	0.50	0.870	0.870	3.00	3.00	3.45	3.45	15.0	15.0	15.0	---
JAN 31 70	FRI	7	1.770	2.6	0.6	0.50	0.50	0.885	0.885	3.00	3.00	3.39	3.39	15.1	15.1	15.1	---
FEB 1 70	SAT	7	3.172	1.0	1.0	0.50	0.50	1.586	1.586	3.00	3.00	1.89	1.89	17.8	17.8	17.8	36.6
FEB 2 70	SUN	4	3.101	4.0	0.5	0.33	0.67	1.023	1.023	2.078	1.40	1.37	1.44	14.0	9.4	19.7	23.6
FEB 3 70	MON	4	2.689	3.9	0.5	0.33	0.67	0.887	0.887	1.40	3.00	1.58	1.67		8.9	18.6	29.5
FEB 4 70	TUE	4	2.583	3.7	0.5	0.33	0.67	0.852	0.852	1.40	3.00	1.64	1.73		8.7	18.3	28.3
FEB 5 70	WED	4	2.347	3.6	0.7	0.33	0.67	0.775	0.775	1.40	2.80	1.81	1.78		8.2	16.9	22.1
FEB 6 70	THU	4	2.160	3.5	0.8	0.33	0.67	0.713	0.713	1.40	2.80	1.96	1.93		8.0	16.1	20.6
FEB 7 70	FRI	4	2.014	3.1	0.8	0.33	0.67	0.665	0.665	1.40	2.80	2.11	2.08				---

Date Obsv	Day of Week	Scap type	Total Flow	Max Flow	Min Flow	PCT Side 1	PCT Side 2	Flow Side 1	Flow Side 2	LCRC Side 1	LCRC Side 2	RCRC Ratio 1	RCRC Ratio 2	Temp	HYD Load 1	HYD Load 2	NOD Load 1
APR 3 70	PRI	7	3.229	4.5	1.3	0.80	0.80	0.646	2.583	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 4 70	SAT	7	2.631	3.9	1.1	0.80	0.80	0.526	2.105	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 5 70	SUN	7	2.371	3.6	1.0	0.80	0.80	0.474	1.897	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 6 70	MON	7	2.746	4.2	0.8	0.80	0.80	0.549	2.197	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 7 70	TUE	7	2.660	3.8	0.8	0.80	0.80	0.532	2.128	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 8 70	WED	7	2.567	3.8	0.8	0.80	0.80	0.511	2.054	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 9 70	THU	7	2.554	3.7	0.7	0.80	0.80	0.511	2.043	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 10 70	FRI	7	2.197	3.7	0.7	0.80	0.80	0.479	1.918	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 11 70	SAT	7	2.101	3.3	0.7	0.80	0.80	0.420	1.681	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 12 70	SUN	7	1.962	2.9	0.7	0.80	0.80	0.392	1.570	0.84	0.84	1.30	1.30	17.0	5.8	21.1	28.1
APR 13 70	MON	7	2.532	4.1	1.3	0.80	0.80	0.000	2.532	0.00	0.00	1.00	1.00	19.0	0.0	9.8	0.0
APR 14 70	TUE	7	2.575	3.7	1.0	1.00	1.00	0.000	2.575	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 15 70	WED	7	2.404	3.6	0.9	1.00	1.00	0.000	2.404	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 16 70	THU	7	2.137	3.4	0.8	1.00	1.00	0.000	2.137	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 17 70	FRI	7	1.886	3.0	0.8	1.00	1.00	0.000	1.886	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 18 70	SAT	7	1.795	2.8	0.7	1.00	1.00	0.000	1.795	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 19 70	SUN	7	2.096	3.2	0.6	1.00	1.00	0.000	2.096	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 20 70	MON	7	2.047	3.2	0.7	1.00	1.00	0.000	2.047	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 21 70	TUE	7	2.029	3.0	0.6	1.00	1.00	0.000	2.029	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 22 70	WED	7	2.029	3.0	0.6	1.00	1.00	0.000	2.029	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 23 70	THU	7	2.465	3.7	0.9	1.00	1.00	0.000	2.465	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 24 70	FRI	7	2.330	3.6	0.7	1.00	1.00	0.000	2.330	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 25 70	SAT	7	2.018	3.2	0.7	1.00	1.00	0.000	2.018	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 26 70	SUN	7	1.897	2.8	0.7	1.00	1.00	0.000	1.897	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 27 70	MON	7	2.450	3.3	0.7	1.00	1.00	0.000	2.450	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 28 70	TUE	7	2.523	3.5	0.7	1.00	1.00	0.000	2.523	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 29 70	WED	7	2.461	3.5	0.7	1.00	1.00	0.000	2.461	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
APR 30 70	THU	7	2.467	3.5	0.7	1.00	1.00	0.000	2.467	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
MAY 1 70	FRI	7	2.381	3.6	0.8	1.00	1.00	0.000	2.381	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
MAY 2 70	SAT	7	2.152	3.6	0.8	1.00	1.00	0.000	2.152	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
MAY 3 70	SUN	7	2.189	3.5	0.9	1.00	1.00	0.000	2.189	1.00	1.00	1.00	1.00	17.0	0.0	9.8	0.0
MAY 4 70	MON	7	3.055	4.3	1.0	0.00	0.00	0.000	3.055	0.00	0.00	1.00	1.00	19.5	0.0	18.4	0.0
MAY 5 70	TUE	7	2.696	4.0	0.9	0.00	0.00	0.000	2.696	0.00	0.00	1.00	1.00	20.5	0.0	13.0	0.0
MAY 6 70	WED	7	2.502	3.7	0.7	1.00	1.00	0.000	2.502	1.00	1.00	1.00	1.00	21.0	0.0	12.2	0.0
MAY 7 70	THU	7	2.491	3.6	0.8	1.00	1.00	0.000	2.491	1.00	1.00	1.00	1.00	21.0	0.0	12.1	0.0
MAY 8 70	FRI	7	2.332	3.7	0.7	1.00	1.00	0.000	2.332	1.00	1.00	1.00	1.00	21.0	0.0	11.6	0.0
MAY 9 70	SAT	7	1.869	3.1	0.7	1.00	1.00	0.000	1.869	1.00	1.00	1.00	1.00	21.0	0.0	9.8	0.0
MAY 10 70	SUN	7	1.837	2.6	0.7	1.00	1.00	0.000	1.837	1.00	1.00	1.00	1.00	21.0	0.0	9.8	0.0
MAY 11 70	MON	7	2.348	3.6	0.7	1.00	1.00	0.000	2.348	1.00	1.00	1.00	1.00	22.0	8.8	21.2	0.0
MAY 12 70	TUE	7	2.392	3.7	0.7	1.00	1.00	0.000	2.392	1.00	1.00	1.00	1.00	22.0	0.0	11.8	0.0
MAY 13 70	WED	7	2.402	3.6	0.7	1.00	1.00	0.000	2.402	1.00	1.00	1.00	1.00	22.0	0.0	11.8	0.0
MAY 14 70	THU	7	2.371	3.7	0.7	1.00	1.00	0.000	2.371	1.00	1.00	1.00	1.00	22.0	0.0	11.8	0.0
MAY 15 70	FRI	7	2.244	3.5	0.7	0.50	0.50	1.186	1.186	3.40	2.50	2.87	2.11	22.0	17.8	14.3	12.1
MAY 16 70	SAT	7	2.086	3.3	0.8	0.50	0.50	1.122	1.122	3.40	2.50	3.03	2.23	22.0	17.5	14.0	12.1
MAY 17 70	SUN	7	1.920	2.9	0.8	0.50	0.50	1.023	1.023	3.40	2.50	3.32	2.44	22.0	17.1	13.7	12.1
MAY 18 70	MON	7	2.320	3.7	0.8	0.50	0.50	0.960	0.960	3.40	2.50	3.54	2.60	22.0	16.9	13.4	12.1
MAY 19 70	TUE	7	2.265	3.5	0.7	0.50	0.50	1.167	1.167	3.40	2.50	2.91	2.14	22.0	17.7	14.2	12.1
MAY 20 70	WED	7	2.207	3.3	0.7	0.50	0.50	1.132	1.132	3.40	2.50	3.00	2.21	22.0	17.6	14.1	12.1
MAY 21 70	THU	7	2.155	3.4	0.7	0.50	0.50	1.111	1.111	3.40	2.50	3.08	2.27	22.0	17.5	14.0	12.1
MAY 22 70	FRI	7	2.222	3.3	0.7	0.50	0.50	1.077	1.077	3.40	2.50	3.06	2.25	22.0	17.5	14.0	12.1
MAY 23 70	SAT	7	1.744	2.9	0.7	0.50	0.50	0.897	0.897	3.40	2.50	3.16	2.32	22.0	17.4	13.4	12.1
MAY 24 70	SUN	7	1.705	2.5	0.7	0.50	0.50	0.852	0.852	3.40	2.50	3.79	2.79	22.0	16.7	13.2	12.1
MAY 25 70	MON	7	2.134	3.3	0.9	0.50	0.50	1.067	1.067	3.40	2.50	3.99	2.93	22.0	16.5	13.0	10.7

Date of Obsv	Day of Week	Day of Smp	Total Flow	Max Flow	Min Flow	Prcf Side 1	Prcf Side 2	Flow Side 1	Flow Side 2	RCBC Side 1	RCBC Side 2	RCBC Ratio	RCBC Ratio	Temp	HYD Load 1	HYD Load 2	MOD Load
MAY 26 70	TUE	6	2.176	1.3	0.8	0.50	0.50	1.058	1.058	3.40	2.50	3.21	2.36	23.5	17.3	13.6	---
MAY 27 70	WED	6	1.849	3.2	0.7	0.50	0.50	0.943	0.943	3.40	2.50	3.60	2.65	23.0	16.8	13.3	---
MAY 28 70	THU	6	1.756	2.9	0.6	0.50	0.50	0.883	0.883	3.40	2.50	3.97	2.83	23.0	16.5	13.0	---
MAY 29 70	FRI	6	1.713	2.8	0.6	0.50	0.50	0.856	0.856	3.40	2.50	4.39	3.23	23.0	16.1	12.7	---
MAY 30 70	SAT	6	1.550	2.4	0.6	0.50	0.50	0.775	0.775	3.40	2.50	4.56	3.35	23.0	16.1	12.6	7.0
MAY 31 70	SUN	6	1.492	2.2	0.7	0.50	0.50	0.746	0.746	3.40	2.50	4.61	3.35	23.0	16.1	12.6	---
JUN 1 70	MON	6	1.842	3.1	0.7	0.50	0.50	0.841	0.841	3.40	2.50	3.61	2.66	23.0	16.8	13.3	---
JUN 2 70	TUE	6	1.765	2.8	0.6	0.50	0.50	0.882	0.882	3.40	2.50	3.85	2.83	23.0	16.6	13.1	18.5
JUN 3 70	WED	6	1.745	2.9	0.7	0.50	0.50	1.172	1.172	3.40	2.50	2.88	1.82	23.0	18.5	15.0	---
JUN 4 70	THU	6	1.780	2.7	0.7	0.50	0.50	0.890	0.890	3.40	2.50	3.62	2.81	23.0	16.6	13.1	23.4
JUN 5 70	FRI	6	1.886	2.9	0.8	0.50	0.50	0.943	0.943	3.40	2.50	3.61	2.65	24.0	16.8	13.3	---
JUN 6 70	SAT	6	1.676	2.6	0.7	0.50	0.50	0.838	0.838	3.40	2.50	4.06	2.98	24.0	16.4	12.9	---
JUN 7 70	SUN	6	1.497	2.4	0.7	0.50	0.50	0.748	0.748	3.40	2.50	4.54	3.34	24.0	16.1	12.6	6.3
JUN 8 70	MON	6	1.956	3.1	0.6	0.50	0.50	0.978	0.978	3.40	2.50	3.88	2.56	24.0	17.0	13.5	---
JUN 9 70	TUE	6	1.952	3.1	0.7	0.50	0.50	0.976	0.976	3.40	2.50	3.55	2.46	24.0	17.1	13.6	6.1
JUN 10 70	WED	9	2.032	3.1	0.8	0.50	0.50	1.016	1.016	3.40	2.50	3.52	2.52	24.0	17.0	13.5	17.7
JUN 11 70	THU	9	1.988	3.4	0.7	0.50	0.50	0.994	0.994	3.40	2.50	3.59	2.64	25.0	16.8	13.4	---
JUN 12 70	FRI	9	1.892	3.0	0.6	0.50	0.50	0.946	0.946	3.40	2.50	4.23	3.11	25.0	16.3	12.8	8.6
JUN 13 70	SAT	6	1.607	2.6	0.7	0.50	0.50	0.803	0.803	3.40	2.50	4.55	3.34	24.0	17.0	13.5	---
JUN 14 70	SUN	6	1.496	2.3	0.6	0.50	0.50	0.748	0.748	3.40	2.50	3.66	2.54	24.0	17.0	13.5	23.5
JUN 15 70	MON	6	1.968	3.2	0.7	0.50	0.50	0.984	0.984	3.40	2.50	3.41	2.51	25.0	17.0	13.6	---
JUN 16 70	TUE	6	1.933	3.1	0.7	0.50	0.50	0.996	0.996	3.40	2.50	3.42	2.51	25.0	17.0	13.5	24.6
JUN 17 70	WED	6	1.949	3.1	0.8	0.50	0.50	0.994	0.994	3.40	2.50	3.52	2.57	25.0	16.8	13.3	---
JUN 18 70	THU	6	1.849	3.1	0.7	0.50	0.50	0.974	0.974	3.40	2.50	3.62	2.66	25.0	16.8	13.3	---
JUN 19 70	FRI	6	1.880	3.2	0.7	0.50	0.50	0.940	0.940	3.40	2.50	4.10	3.02	25.0	16.4	12.9	---
JUN 20 70	SAT	6	1.658	2.6	0.7	0.50	0.50	0.829	0.829	3.40	2.50	4.51	3.32	26.0	16.1	12.6	22.2
JUN 21 70	SUN	6	1.507	2.2	0.7	0.50	0.50	0.753	0.753	3.40	2.50	3.45	2.53	26.0	17.0	13.5	---
JUN 22 70	MON	6	1.973	3.0	0.7	0.50	0.50	0.986	0.986	3.40	2.50	3.49	2.56	26.0	17.0	13.5	22.5
JUN 23 70	TUE	6	1.951	3.2	0.7	0.50	0.50	0.975	0.975	3.40	2.50	3.52	2.59	26.0	16.9	13.4	---
JUN 24 70	WED	6	1.931	3.1	0.7	0.50	0.50	0.965	0.965	3.40	2.50	2.83	2.08	25.0	17.8	14.4	30.3
JUN 25 70	THU	6	2.405	4.3	1.1	0.50	0.50	1.202	1.202	3.40	2.50	3.31	2.44	25.5	17.2	13.7	---
JUN 26 70	FRI	6	2.052	3.2	0.8	0.50	0.50	1.026	1.026	3.40	2.50	4.12	3.03	25.5	16.4	12.9	---
JUN 27 70	SAT	6	1.651	2.7	0.7	0.50	0.50	0.825	0.825	3.40	2.50	5.17	4.76	25.0	17.6	14.4	15.8
JUN 28 70	SUN	6	1.471	2.2	0.6	0.50	0.50	0.735	0.735	3.80	3.50	3.92	3.61	25.0	18.5	17.3	---
JUN 29 70	MON	6	1.840	3.2	0.7	0.50	0.50	0.970	0.970	3.80	3.50	3.80	3.54	25.0	18.6	17.4	25.9
JUN 30 70	TUE	6	1.877	3.1	0.7	0.50	0.50	0.988	0.988	3.80	3.50	3.80	3.50	25.0	18.6	17.4	---
JUL 1 70	WED	6	2.002	3.1	0.7	0.50	0.50	1.001	1.001	3.80	3.50	3.96	3.65	25.0	18.4	17.3	19.6
JUL 2 70	THU	6	1.818	2.9	0.7	0.50	0.50	0.959	0.959	3.80	3.50	4.16	3.83	25.0	18.3	17.1	---
JUL 3 70	FRI	6	1.829	3.2	0.7	0.50	0.50	0.914	0.914	3.80	3.50	4.86	4.74	26.0	17.8	16.6	15.1
JUL 4 70	SAT	6	1.563	2.4	0.7	0.50	0.50	0.781	0.781	3.80	3.50	5.16	4.76	26.0	17.8	16.6	---
JUL 5 70	SUN	6	1.472	2.1	0.6	0.50	0.50	0.736	0.736	3.80	3.50	4.20	3.87	26.0	18.2	17.1	---
JUL 6 70	MON	6	1.808	2.8	0.7	0.50	0.50	0.904	0.904	3.80	3.50	3.95	3.64	26.0	18.5	17.3	---
JUL 7 70	TUE	6	1.925	3.1	0.7	0.50	0.50	0.962	0.962	3.80	3.50	3.99	3.67	26.0	18.4	17.3	25.2
JUL 8 70	WED	6	1.905	2.9	0.7	0.50	0.50	0.952	0.952	3.80	3.50	3.96	3.65	25.0	18.4	17.3	---
JUL 9 70	THU	6	1.919	2.9	0.7	0.50	0.50	0.959	0.959	3.80	3.50	3.49	3.22	26.0	18.9	17.8	---
JUL 10 70	FRI	6	2.175	3.9	0.9	0.50	0.50	1.087	1.087	3.80	3.50	4.36	4.02	26.0	18.1	16.9	20.9
JUL 11 70	SAT	6	1.713	2.7	0.8	0.50	0.50	0.794	0.794	3.80	3.50	4.78	4.41	26.0	17.8	16.6	---
JUL 12 70	SUN	6	1.589	2.3	0.7	0.50	0.50	0.781	0.781	3.80	3.50	3.85	3.55	26.0	18.6	17.4	---
JUL 13 70	MON	6	1.933	3.1	0.8	0.50	0.50	0.986	0.986	3.80	3.50	4.00	3.68	27.0	18.4	17.3	---
JUL 14 70	TUE	6	1.931	2.9	0.7	0.50	0.50	0.950	0.950	3.80	3.50	4.00	3.74	27.0	18.4	17.2	---
JUL 15 70	WED	6	1.934	2.7	0.8	0.50	0.50	0.937	0.937	3.80	3.50	4.28	3.94	27.0	18.2	17.0	---
JUL 16 70	THU	6	1.777	2.7	0.6	0.50	0.50	0.888	0.888	3.80	3.50	4.21	3.59	27.0	16.3	14.4	---
JUL 17 70	FRI	6	1.615	2.7	0.7	0.50	0.50	0.807	0.807	3.40	2.90	4.21	3.59	27.0	16.3	14.4	---

Date Obs	Day of Week	Camp Type	Total Flow	Max Flow	Min Flow	FRCT Side 1	FRCT Side 2	Flow Side 1	Flow Side 2	RCRC Side 1	RCRC Side 2	MCRC Ratio	MCRC Ratio	PCRC Ratio	Temp	HYD Load 1	HYD Load 2	BCD Load 1
JUL 18 70	SAT	6	1.409	2.2	0.7	0.50	0.50	0.704	0.704	3.40	2.90	4.83	4.12	---	---	15.9	18.0	---
JUL 19 70	SUN	6	1.382	1.9	0.6	0.50	0.50	0.691	0.691	3.40	2.90	4.92	4.20	---	---	15.9	18.0	---
JUL 20 70	MON	6	2.077	3.8	0.7	0.50	0.50	1.038	1.038	3.40	2.90	3.27	2.79	26.0	26.0	15.9	13.9	---
JUL 21 70	TUE	6	1.931	2.8	0.8	0.50	0.50	0.955	0.955	3.40	2.90	3.56	3.27	---	---	17.2	15.3	---
JUL 22 70	TUE	6	1.985	2.9	0.8	0.67	0.33	1.130	0.655	3.40	2.90	2.56	4.43	---	---	16.9	13.8	---
JUL 23 70	THU	6	2.003	2.9	0.8	0.67	0.33	1.342	0.661	3.40	2.90	2.81	3.93	---	---	18.3	13.8	---
JUL 24 70	THU	6	1.900	2.5	0.8	0.67	0.33	1.273	0.627	3.40	2.90	2.99	4.31	---	---	19.9	12.6	---
JUL 25 70	FRI	6	1.715	2.0	0.7	0.67	0.33	1.149	0.566	3.40	2.90	3.11	4.77	---	---	19.2	12.7	---
JUL 26 70	SUN	6	1.517	2.3	0.6	0.67	0.33	1.036	0.501	3.40	2.90	3.28	5.39	---	---	18.7	12.4	16.9
JUL 27 70	MON	6	1.995	3.2	0.8	0.67	0.33	1.337	0.658	3.40	2.90	2.86	4.10	---	---	19.9	13.0	---
JUL 28 70	TUE	6	1.942	3.0	0.7	0.67	0.33	1.328	0.658	3.40	2.90	2.86	4.10	---	---	19.9	13.0	---
JUL 29 70	WED	6	1.927	3.0	0.7	0.67	0.33	1.281	0.636	3.40	2.90	2.86	4.10	---	---	19.7	12.9	---
JUL 30 70	THU	6	1.882	2.9	0.7	0.67	0.33	1.266	0.636	3.40	2.90	2.86	4.10	---	---	19.7	12.9	---
JUL 31 70	FRI	6	1.889	2.9	0.7	0.67	0.33	1.261	0.621	3.40	2.90	3.01	4.35	---	---	19.7	12.9	---
AUG 1 70	SAT	6	1.992	2.2	0.7	0.67	0.33	1.065	0.524	3.40	2.90	1.00	1.00	---	---	19.6	12.9	---
AUG 2 70	SUN	6	1.920	3.1	0.7	0.67	0.33	1.000	0.492	3.40	2.90	1.00	1.00	---	---	19.6	12.9	---
AUG 3 70	MON	6	1.845	3.2	0.7	0.67	0.33	1.286	0.634	3.40	2.90	1.00	1.00	---	---	19.6	12.9	---
AUG 4 70	TUE	6	1.848	3.1	0.7	0.67	0.33	1.236	0.609	3.40	2.90	1.00	1.00	---	---	19.6	12.9	---
AUG 5 70	WED	6	1.848	3.1	0.7	0.67	0.33	1.238	0.610	3.40	2.90	1.00	1.00	---	---	19.6	12.9	---
AUG 6 70	THU	6	2.957	3.2	0.7	0.67	0.33	1.981	0.976	3.40	2.90	1.00	1.00	---	---	19.7	12.8	---
AUG 7 70	FRI	6	1.842	2.4	0.7	0.67	0.33	1.234	0.608	3.40	2.90	1.00	1.00	---	---	22.6	18.2	41.6
AUG 8 70	SAT	6	1.568	3.0	0.7	0.67	0.33	1.051	0.517	3.40	2.90	1.00	1.00	---	---	19.6	12.8	---
AUG 9 70	SUN	6	1.784	2.0	0.7	0.67	0.33	1.198	0.590	3.40	2.90	3.21	4.58	25.0	25.0	19.6	12.8	68.2
AUG 10 70	MON	6	2.667	3.5	1.3	0.67	0.33	1.787	0.880	3.40	2.90	2.15	3.07	25.0	25.0	21.8	13.9	---
AUG 11 70	TUE	6	2.174	3.2	0.8	0.67	0.33	1.457	0.717	3.40	2.90	2.03	4.17	25.0	25.0	20.0	13.0	---
AUG 12 70	WED	6	1.964	2.8	0.8	0.67	0.33	1.316	0.648	3.40	2.90	2.03	4.31	26.0	26.0	19.9	12.9	30.7
AUG 13 70	THU	6	1.899	2.8	0.7	0.67	0.33	1.272	0.627	3.40	2.90	3.03	4.32	---	---	19.8	12.9	---
AUG 14 70	FRI	6	1.895	1.0	1.0	0.67	0.33	1.270	0.625	3.40	2.90	3.03	4.32	---	---	19.8	12.9	---
AUG 15 70	SUN	6	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	---	---	19.1	12.1	49.2
AUG 16 70	MON	6	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	---	---	19.1	12.1	---
AUG 17 70	TUE	11	1.750	3.4	0.6	0.67	0.33	1.172	0.577	3.75	2.55	3.20	4.42	26.5	26.5	22.3	13.6	---
AUG 18 70	WED	6	1.930	3.1	0.9	0.67	0.33	1.952	0.961	3.40	2.55	1.95	2.65	---	---	19.9	12.4	43.9
AUG 19 70	THU	6	1.930	3.1	0.9	0.67	0.33	1.333	0.657	3.40	2.55	2.85	3.88	26.5	26.5	19.9	12.4	---
AUG 20 70	FRI	6	1.887	3.1	0.8	0.67	0.33	1.264	0.623	3.75	2.55	2.87	4.10	---	---	19.9	12.3	---
AUG 21 70	SUN	6	1.927	3.7	1.3	0.67	0.33	1.291	0.626	3.40	2.55	2.84	4.01	---	---	19.7	12.3	---
AUG 22 70	MON	6	1.971	3.2	0.8	0.67	0.33	1.321	0.630	3.40	2.55	2.88	3.92	26.5	26.5	19.8	12.4	20.3
AUG 23 70	TUE	6	1.808	2.8	0.8	0.67	0.33	1.209	0.585	3.40	2.55	3.14	4.28	---	---	19.8	12.2	---
AUG 24 70	WED	6	1.722	2.6	0.9	0.67	0.33	1.154	0.568	3.40	2.55	3.29	4.49	27.0	27.0	19.2	12.1	---
AUG 25 70	THU	6	1.674	2.6	0.9	0.67	0.33	1.135	0.559	3.40	2.55	3.35	4.56	---	---	19.1	12.1	22.6
AUG 26 70	FRI	6	1.671	2.7	0.9	0.67	0.33	1.120	0.551	3.40	2.55	3.39	4.62	---	---	19.1	12.0	---
AUG 27 70	SAT	6	1.498	2.5	0.7	0.67	0.33	1.004	0.494	3.40	2.55	3.79	5.16	27.0	27.0	18.6	11.8	31.5
AUG 28 70	SUN	6	1.399	2.5	0.7	0.67	0.33	0.937	0.462	3.40	2.55	4.05	5.52	---	---	18.4	11.7	---
AUG 29 70	MON	6	1.779	2.7	0.8	0.67	0.33	1.192	0.587	3.40	2.55	3.19	4.34	26.5	26.5	19.3	12.2	20.1
AUG 30 70	TUE	6	1.742	2.7	0.7	0.50	0.50	0.871	0.871	3.40	2.60	4.36	2.99	27.0	27.0	18.1	13.5	20.1
SEP 1 70	WED	6	1.718	2.9	0.6	0.50	0.50	0.859	0.859	1.00	2.60	1.86	3.03	27.0	27.0	9.5	13.4	26.9
SEP 2 70	THU	6	1.000	2.4	0.6	0.50	0.50	1.000	1.000	2.90	3.00	1.00	1.00	---	---	9.0	6.3	---
SEP 3 70	FRI	6	1.451	2.5	0.6	0.50	0.50	0.725	0.725	1.60	0.90	2.21	1.24	27.0	27.0	9.6	6.8	20.0
SEP 4 70	SUN	6	1.734	2.8	0.6	0.50	0.50	0.867	0.867	1.60	0.90	1.85	1.04	27.0	27.0	9.6	6.8	---
SEP 5 70	MON	6	1.734	2.8	0.6	0.50	0.50	0.867	0.867	1.60	0.90	1.77	0.99	27.0	27.0	9.7	7.0	---
SEP 6 70	TUE	10	1.812	2.9	0.7	0.50	0.50	0.906	0.906	1.60	0.90	1.77	1.00	27.0	27.0	9.7	7.0	22.8
SEP 7 70	WED	6	1.808	2.9	0.7	0.50	0.50	0.904	0.904	1.60	0.90	1.77	1.00	27.0	27.0	9.7	7.0	---
SEP 8 70	THU	10	1.808	2.9	0.7	0.50	0.50	0.904	0.904	1.60	0.90	1.77	1.00	27.0	27.0	9.7	7.0	---

Date of Obsv	Day of Week	Day of Samp Type	Total Flow	Max Flow	Min Flow	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	PCMC Side 1	PCMC Side 2	ECMC Ratio	ECMC Ratio	PCMC Ratio	Temp	HYD Load 1	HYD Load 2	RCD Load 1
SEP 11 70	FRI	--	1.979	3.1	0.7	0.50	0.50	0.989	0.989	1.60	1.60	1.62	1.62	0.91	27.0	10.0	7.3	--
SEP 12 70	SAT	--	2.031	3.6	0.7	0.50	0.50	1.015	1.015	1.60	1.60	1.58	1.58	0.89	27.0	10.1	7.4	18.5
SEP 13 70	SUN	6	2.031	3.2	0.7	0.50	0.50	0.953	0.953	1.60	1.60	1.68	1.68	0.94	27.0	9.9	7.2	18.5
SEP 14 70	MON	12	1.907	3.2	0.7	0.50	0.50	0.953	0.953	1.60	1.60	1.68	1.68	0.94	27.0	9.9	7.2	18.5
SEP 15 70	TUE	6	2.264	3.7	0.7	0.50	0.50	1.132	1.132	1.60	1.60	1.41	1.41	0.80	27.0	10.6	7.9	27.4
SEP 16 70	WED	6	2.320	3.7	0.7	0.50	0.50	1.160	1.160	1.60	1.60	1.38	1.38	0.78	27.5	10.7	8.0	27.4
SEP 17 70	THU	12	2.320	3.7	0.7	0.50	0.50	1.160	1.160	1.60	1.60	1.38	1.38	0.78	27.5	10.7	8.0	27.4
SEP 18 70	FRI	6	2.391	3.7	0.7	0.50	0.50	1.195	1.195	1.60	1.60	1.18	1.18	0.75	27.5	10.8	8.1	38.7
SEP 19 70	SAT	12	2.498	3.6	0.7	0.50	0.50	1.249	1.249	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 20 70	SUN	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 21 70	MON	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 22 70	TUE	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 23 70	WED	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 24 70	THU	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 25 70	FRI	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 26 70	SAT	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 27 70	SUN	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 28 70	MON	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 29 70	TUE	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
SEP 30 70	WED	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 1 70	THU	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 2 70	FRI	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 3 70	SAT	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 4 70	SUN	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 5 70	MON	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 6 70	TUE	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 7 70	WED	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 8 70	THU	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 9 70	FRI	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 10 70	SAT	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 11 70	SUN	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 12 70	MON	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 13 70	TUE	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 14 70	WED	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 15 70	THU	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 16 70	FRI	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 17 70	SAT	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 18 70	SUN	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 19 70	MON	12	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 20 70	TUE	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7
OCT 21 70	WED	6	2.487	3.7	0.7	0.50	0.50	1.223	1.223	1.60	1.60	1.28	1.28	0.72	27.5	11.0	8.3	38.7

Date of Obsv	Day of Week	Sam Type	Total Flow	Max Flow	Min Flow	PFCT Side 1	PFCT Side 2	Flow Side 1	Flow Side 2	BCBC Side 1	BCBC Side 2	BCBC Ratio 1	BCBC Ratio 2	Temp	NYD Load 1	NYD Load 2	RSD Load 1
OCT 21 70	WED	6	2.845	4.2	0.8	0.33	0.67	0.939	1.966	3.80	2.90	0.05	1.52	24.0	18.6	18.6	---
OCT 22 70	THU	6	2.484	3.6	0.8	0.33	0.67	0.820	1.684	3.80	2.90	0.44	1.74	23.0	17.9	17.7	18.9
OCT 23 70	FRI	12	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	24.0	17.3	17.3	---
OCT 24 70	SAT	13	2.350	3.5	0.8	0.33	0.67	0.775	1.574	3.80	2.90	4.90	1.84	25.0	17.3	17.3	18.5
OCT 25 70	SUN	13	1.947	3.3	0.7	0.33	0.67	0.656	1.331	3.80	2.90	5.80	2.18	24.0	17.3	17.3	---
OCT 26 70	MON	6	1.995	2.9	0.7	0.33	0.67	0.658	1.317	3.80	2.90	5.77	2.17	23.0	17.3	16.4	---
OCT 27 70	TUE	12	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	23.0	17.3	17.3	---
OCT 28 70	WED	6	2.441	4.2	0.7	0.33	0.67	0.806	1.635	3.80	2.90	4.72	1.77	23.0	17.9	17.6	21.1
OCT 29 70	THU	12	2.432	3.7	0.7	0.33	0.67	0.803	1.629	3.80	2.90	4.71	1.78	21.0	17.8	17.6	---
OCT 30 70	FRI	6	2.370	3.6	0.7	0.33	0.67	0.782	1.588	3.80	2.90	4.86	1.81	21.0	17.8	17.5	25.8
OCT 31 70	SAT	12	2.401	3.6	0.8	0.33	0.67	0.792	1.609	3.80	2.90	4.80	1.80	21.0	17.8	17.5	---
NOV 1 70	SUN	10	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	22.0	19.3	20.5	---
NOV 2 70	MON	6	3.076	5.0	1.7	0.33	0.67	1.174	2.384	3.80	2.90	3.24	1.22	21.0	18.7	19.2	---
NOV 3 70	TUE	10	2.742	4.2	1.0	0.33	0.67	1.015	2.061	3.80	2.90	3.78	1.41	21.0	18.2	18.4	18.5
NOV 4 70	WED	6	2.827	4.2	1.0	0.33	0.67	0.933	1.894	3.80	2.90	4.07	1.53	21.5	18.3	18.6	---
NOV 5 70	THU	6	2.598	3.6	0.9	0.33	0.67	0.893	1.813	3.80	2.90	4.26	1.60	23.0	18.2	18.3	---
NOV 6 70	FRI	10	2.363	3.6	0.7	0.33	0.67	0.856	1.734	3.80	2.90	4.85	1.67	22.0	18.0	18.0	20.9
NOV 7 70	SAT	10	2.296	3.4	0.8	0.33	0.67	0.780	1.583	3.80	2.90	4.87	1.83	22.0	17.8	17.4	---
NOV 8 70	SUN	6	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	21.5	17.7	17.2	---
NOV 9 70	MON	6	2.153	4.1	0.7	0.33	0.67	0.714	1.449	3.80	2.90	5.02	1.89	22.0	17.5	16.9	19.5
NOV 10 70	TUE	6	2.042	3.1	0.7	0.33	0.67	0.674	1.368	3.80	2.90	5.64	2.12	21.0	17.3	16.5	---
NOV 11 70	WED	6	2.391	3.6	0.7	0.33	0.67	0.789	1.602	3.80	2.90	4.02	1.81	21.0	17.8	17.4	21.4
NOV 12 70	THU	6	2.867	3.7	1.1	0.33	0.67	0.946	1.921	3.80	2.90	4.02	1.51	22.0	18.4	18.7	---
NOV 13 70	FRI	6	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	21.5	18.6	19.0	---
NOV 14 70	SAT	6	2.995	4.2	1.0	0.33	0.67	0.988	2.007	3.80	2.90	3.84	1.45	21.0	18.0	17.8	---
NOV 15 70	SUN	6	2.531	3.6	0.8	0.33	0.67	0.835	1.696	3.80	2.90	4.55	1.71	21.0	17.8	17.4	---
NOV 16 70	MON	6	2.370	3.5	0.9	0.33	0.67	0.782	1.588	3.80	2.90	4.86	1.83	21.0	17.6	17.1	---
NOV 17 70	TUE	6	2.252	3.0	1.1	0.33	0.67	0.743	1.509	3.80	2.90	5.11	1.92	20.5	17.6	17.2	---
NOV 18 70	WED	6	2.281	3.1	0.9	0.33	0.67	0.753	1.528	3.80	2.90	5.05	1.90	21.0	17.8	17.6	---
NOV 19 70	THU	6	2.431	3.4	0.7	0.33	0.67	0.802	1.629	3.80	2.90	4.74	1.78	20.0	17.8	17.6	---
NOV 20 70	FRI	6	2.190	3.3	0.7	0.33	0.67	0.723	1.467	3.80	2.90	5.26	1.98	20.0	17.8	17.6	---
NOV 21 70	SAT	6	2.365	3.1	0.7	0.33	0.67	0.780	1.585	3.80	2.90	4.52	1.81	20.0	17.8	17.4	---
NOV 22 70	SUN	6	2.549	3.5	0.8	0.33	0.67	0.841	1.708	3.80	2.90	4.82	1.70	20.0	18.0	17.9	---
NOV 23 70	MON	6	2.528	3.5	0.7	0.33	0.67	0.834	1.694	3.80	2.90	4.86	1.71	20.5	18.0	17.8	---
NOV 24 70	TUE	6	2.330	3.9	0.8	0.33	0.67	0.769	1.561	3.80	2.90	4.86	1.86	20.0	17.7	17.3	---
NOV 25 70	WED	6	2.126	3.2	0.7	0.33	0.67	0.702	1.428	3.80	2.90	5.22	2.04	19.0	17.4	16.8	---
NOV 26 70	THU	6	2.450	3.5	0.7	0.33	0.67	0.808	1.641	3.80	2.90	4.70	1.77	17.0	17.9	17.6	---
NOV 27 70	FRI	6	2.214	3.1	0.8	0.33	0.67	0.731	1.483	3.80	2.90	5.20	1.94	18.0	17.6	17.0	---
NOV 28 70	SAT	6	1.796	3.2	0.6	0.33	0.67	0.593	1.203	3.80	2.90	6.41	2.41	18.0	17.0	15.9	---
NOV 29 70	SUN	6	1.310	2.8	0.7	0.33	0.67	0.432	0.878	3.80	2.90	8.19	3.30	16.0	16.4	16.6	---
NOV 30 70	MON	6	1.472	2.5	0.7	0.33	0.67	0.486	0.969	3.80	2.90	7.82	2.94	17.0	16.6	15.1	---
DEC 1 70	TUE	6	1.386	2.3	0.7	0.33	0.67	0.457	0.929	3.80	2.90	8.31	3.12	18.0	16.5	16.8	14.1
DEC 2 70	WED	6	1.593	2.5	0.7	0.33	0.67	0.526	1.067	3.80	2.90	7.23	2.72	18.5	16.8	15.4	---
DEC 3 70	THU	6	2.445	3.2	0.7	0.33	0.67	0.807	1.635	3.80	2.90	4.71	1.77	19.0	17.9	17.6	---
DEC 4 70	FRI	6	2.441	3.3	0.8	0.33	0.67	0.806	1.635	3.80	2.90	4.72	1.79	19.0	17.9	17.7	20.7
DEC 5 70	SAT	6	1.000	1.0	1.0	1.00	1.00	1.000	1.000	1.00	1.00	1.00	1.00	19.0	17.8	17.6	---
DEC 6 70	SUN	6	2.421	3.4	0.8	0.33	0.67	0.799	1.622	3.80	2.90	4.76	1.81	19.5	17.8	17.8	19.1
DEC 7 70	MON	6	2.500	3.4	0.8	0.33	0.67	0.825	1.675	3.80	2.90	4.61	1.75	19.5	17.8	17.8	---

Date of Obsv	Day of Week	Samp type	Total Flow	Max Flow	Min Flow	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	MCBC Side 1	MCBC Side 2	MCBC Ratio 1	MCBC Ratio 2	Temp	MYD Load 1	MYD Load 2	RSD Load 1
DEC 3 70	THU	12	1,000	1,0	1,0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	---	---	---	---
DEC 4 70	FRI	99	2,405	3,5	0,8	0,20	0,80	0,481	1,924	2,25	0,00	4,48	0,00	20,0	10,6	7,5	
DEC 5 70	SAT	99	2,111	3,2	0,8	0,20	0,80	0,423	1,690	2,25	1,65	5,32	1,09	19,0	10,4	13,7	
DEC 6 70	SUN	6	2,016	3,1	0,8	0,20	0,80	0,408	1,630	2,25	1,65	5,52	1,13	19,5	10,3	13,5	10,9
DEC 7 70	SUN	12	1,000	1,0	1,0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	---	---	---	
DEC 8 70	MON	99	2,386	3,2	0,8	0,20	0,80	0,477	1,999	2,25	0,00	4,72	0,00	18,0	10,6	7,4	14,1
DEC 9 70	TUE	6	2,438	3,4	0,8	0,20	0,80	0,487	1,947	2,25	0,00	4,62	0,00	18,0	10,6	7,5	
DEC 10 70	TUE	12	1,000	1,0	1,0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	---	---	---	
DEC 11 70	WED	6	2,448	3,3	0,8	0,20	0,80	0,489	1,958	2,25	0,00	4,60	0,00	18,0	10,6	7,6	14,9
DEC 12 70	THU	12	1,000	1,0	1,0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	---	---	---	
DEC 13 70	FRI	99	2,414	3,5	0,8	0,20	0,80	0,483	1,931	2,25	0,00	4,66	0,00	17,0	10,6	7,5	
DEC 14 70	SAT	99	2,164	3,3	0,8	0,20	0,80	0,433	1,731	2,25	0,00	5,20	0,00	19,0	10,6	6,7	9,4
DEC 15 70	SUN	6	1,994	3,0	0,8	0,20	0,80	0,399	1,595	2,25	0,00	5,44	0,00	18,5	10,6	6,2	
DEC 16 70	MON	6	2,453	3,5	0,9	0,20	0,80	0,491	1,962	2,25	0,00	4,59	0,00	18,0	10,6	7,6	13,1
DEC 17 70	TUE	6	2,437	3,5	0,8	0,20	0,80	0,487	1,950	2,25	0,00	4,62	0,00	18,0	10,6	7,6	
DEC 18 70	WED	11	3,266	4,4	1,2	0,20	0,80	0,653	2,613	2,25	0,00	3,44	0,00	18,0	10,6	10,1	
DEC 19 70	THU	6	2,740	3,6	1,0	0,20	0,80	0,548	2,192	2,25	0,00	4,11	0,00	18,0	10,6	8,5	
DEC 20 70	FRI	6	1,550	2,3	0,9	0,20	0,80	0,310	1,240	2,25	0,00	7,26	0,00	17,0	9,9	4,8	
DEC 21 70	MON	6	1,994	3,1	0,9	0,20	0,80	0,399	1,595	2,25	0,00	5,64	0,00	16,0	10,3	6,2	
DEC 22 70	TUE	99	1,828	3,0	0,9	0,20	0,80	0,366	1,462	2,25	2,75	6,15	1,88	17,0	10,1	16,3	
DEC 23 70	WED	99	2,348	3,3	1,2	0,20	0,80	0,470	1,878	2,25	2,75	4,79	1,66	17,5	10,5	17,9	
DEC 24 70	THU	99	2,046	2,9	1,0	0,20	0,80	0,413	1,653	2,25	2,75	5,45	1,66	16,0	10,3	17,1	
DEC 25 70	FRI	99	1,155	2,0	0,9	0,20	0,80	0,231	0,924	2,25	2,75	9,74	2,98	16,0	9,6	14,2	
DEC 26 70	SAT	99	1,404	2,1	1,0	0,20	0,80	0,281	1,123	2,25	2,75	8,01	2,45	15,0	9,8	15,0	
DEC 27 70	SUN	6	1,347	2,0	0,9	0,20	0,80	0,334	1,110	2,25	2,75	8,11	2,48	15,0	9,8	15,0	
DEC 28 70	MON	6	1,669	2,6	0,9	0,20	0,80	0,374	1,315	2,25	2,75	6,74	2,06	14,5	10,0	15,8	
DEC 29 70	TUE	6	1,680	2,5	0,9	0,20	0,80	0,374	1,312	2,25	2,75	6,86	2,10	14,5	10,0	15,7	8,1
DEC 30 70	WED	6	1,588	2,3	0,9	0,20	0,80	0,318	1,270	2,25	2,75	7,08	2,16	14,5	10,0	15,6	
DEC 31 70	THU	99	1,961	2,4	1,0	0,20	0,80	0,392	1,569	2,25	2,75	5,74	1,75	13,5	10,2	16,7	
JAN 1 71	FRI	99	1,728	3,0	1,1	0,20	0,80	0,346	1,382	2,25	1,30	6,51	0,94	13,5	10,1	10,4	
JAN 2 71	SAT	99	1,826	2,5	1,1	0,20	0,80	0,365	1,461	2,25	1,30	5,85	0,85	14,0	10,2	11,0	8,3
JAN 3 71	SUN	6	1,922	2,5	1,1	0,20	0,80	0,384	1,538	2,25	1,30	4,20	0,61	15,0	10,6	13,3	
JAN 4 71	MON	6	2,493	4,5	1,2	0,20	0,80	0,536	2,144	2,25	1,30	4,51	0,65	15,0	10,7	12,8	6,0
JAN 5 71	TUE	6	2,680	5,5	1,2	0,20	0,80	0,494	1,994	2,25	1,30	4,07	0,59	15,0	10,9	13,6	6,9
JAN 6 71	WED	6	1,752	4,2	0,8	0,20	0,80	0,350	1,462	2,25	1,30	5,84	0,84	16,0	10,2	11,0	
JAN 7 71	THU	6	1,927	4,0	0,7	0,20	0,80	0,385	1,582	2,25	1,30	4,07	0,59	15,0	10,9	13,6	
JAN 8 71	FRI	99	2,765	4,0	0,8	0,20	0,80	0,553	2,212	2,25	1,30	4,07	0,59	15,0	10,5	12,3	8,6
JAN 9 71	SAT	99	1,827	4,0	1,8	0,20	0,80	0,470	1,878	2,25	1,30	4,08	0,59	14,0	10,9	13,7	
JAN 10 71	SUN	6	2,757	4,2	1,0	0,20	0,80	0,551	2,206	2,25	1,30	4,01	0,58	15,0	10,9	13,7	10,3
JAN 11 71	MON	6	2,603	4,4	0,9	0,20	0,80	0,561	2,242	2,25	1,30	4,20	0,61	15,0	10,8	13,3	
JAN 12 71	TUE	6	2,678	4,0	0,8	0,20	0,80	0,536	2,142	2,25	1,30	4,24	0,61	15,0	10,8	13,3	13,6
JAN 13 71	WED	6	2,653	3,8	1,0	0,20	0,80	0,518	2,122	2,25	2,55	4,35	1,23	16,0	10,7	17,9	
JAN 14 71	THU	99	2,588	4,0	0,9	0,20	0,80	0,518	2,070	2,25	2,55	4,35	1,23	16,0	10,5	17,1	
JAN 15 71	FRI	99	2,333	3,8	0,9	0,20	0,80	0,467	1,866	2,25	2,55	4,82	1,37	14,0	10,5	17,1	10,9
JAN 16 71	SAT	99	2,333	3,8	0,9	0,20	0,80	0,467	1,866	2,25	2,55	4,82	1,37	14,0	10,5	17,1	
JAN 17 71	SUN	6	2,168	3,7	1,0	0,20	0,80	0,434	1,734	2,25	2,55	5,19	1,47	15,0	10,4	16,6	
JAN 18 71	MON	6	2,559	3,7	1,0	0,20	0,80	0,434	1,734	2,25	2,55	5,19	1,47	15,0	10,4	16,6	
JAN 19 71	TUE	6	2,456	3,6	1,0	0,20	0,80	0,434	1,734	2,25	2,55	5,19	1,47	15,0	10,4	16,6	10,9
JAN 20 71	WED	6	2,415	3,6	1,0	0,20	0,80	0,434	1,734	2,25	2,55	5,19	1,47	15,0	10,4	16,6	
JAN 21 71	THU	6	2,422	3,6	1,0	0,20	0,80	0,434	1,734	2,25	2,55	5,19	1,47	15,0	10,4	16,6	20,4
JAN 22 71	FRI	99	2,407	3,6	1,0	0,20	0,80	0,434	1,734	2,25	2,55	5,19	1,47	15,0	10,4	16,6	26,0
JAN 23 71	SAT	99	2,289	3,5	1,0	0,20	0,80	0,434	1,734	2,25	2,55	5,19	1,47	15,0	10,4	16,6	

Date of Obsv	Day of Week	Stamp	Total Flow	Max Flow	Min Flow	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	ECSC Side 1	ECSC Side 2	NCRC Ratio 1	NCRC Ratio 2	Temp	HYD Load 1	HYD Load 2	BCD Load 1
JAN 24 71	SUN	6	2.271	3.3	1.3	0.33	0.67	0.749	1.522	0.70	2.25	0.93	1.48	15.0	2.6	18.6	21.6
JAN 25 71	MON	6	2.561	3.8	1.0	0.33	0.67	0.845	1.716	0.70	3.00	0.83	1.75	15.0	6.0	18.3	
JAN 26 71	TUE	6	2.381	3.4	1.0	0.33	0.67	0.786	1.595	0.70	3.00	0.89	1.88	15.0	5.8	17.8	15.3
JAN 27 71	WED	6	2.182	3.5	1.0	0.33	0.67	0.720	1.462	0.70	3.00	0.97	2.05	14.0	5.5	17.3	15.5
JAN 28 71	THU	6	2.077	3.5	1.0	0.33	0.67	0.685	1.392	0.70	3.00	1.02	2.16	13.0	5.4	17.0	
JAN 29 71	FRI	99	1.987	3.4	0.9	0.33	0.67	0.659	1.338	0.70	3.00	1.06	2.24	13.0	5.3	16.8	
JAN 30 71	SAT	99	1.895	2.9	0.9	0.33	0.67	0.629	1.270	0.70	3.00	1.12	2.36	14.0	5.1	16.5	
JAN 31 71	SUN	99	2.010	2.8	0.9	0.33	0.67	0.663	1.347	0.70	3.00	1.06	2.23	14.0	5.3	16.8	
FEB 1 71	MON	6	1.987	3.5	0.8	0.33	0.67	0.656	1.331	0.70	3.00	1.07	2.25	13.5	5.3	16.8	
FEB 2 71	TUE	6	3.735	2.8	0.9	0.33	0.67	1.233	2.502	0.70	3.60	0.57	1.44	7.5	7.5	23.7	29.8
FEB 3 71	WED	6	1.815	2.7	0.9	0.33	0.67	0.599	1.216	0.70	3.00	0.97	1.96	5.0	5.0	18.7	
FEB 4 71	THU	6	2.187	3.3	1.0	0.33	0.67	0.722	1.465	0.70	3.00	0.97	0.78	13.0	5.5	10.7	18.4
FEB 5 71	FRI	99	2.495	3.3	1.2	0.33	0.67	0.823	1.672	0.70	3.00	0.64	0.95	13.0	18.0	11.5	
FEB 6 71	SAT	99	2.052	3.0	1.0	0.33	0.67	0.677	1.375	0.82	1.30	5.44	0.95	12.0	17.4	10.3	17.5
FEB 7 71	SUN	6	2.407	3.3	1.6	0.33	0.67	0.794	1.613	0.82	1.30	4.81	0.71	12.0	17.9	11.4	
FEB 8 71	MON	6	2.746	3.5	1.4	0.33	0.67	0.906	1.880	0.70	1.30	0.77	0.71	11.0	6.2	12.2	
FEB 9 71	TUE	6	2.449	3.4	1.1	0.33	0.67	0.808	1.641	0.70	1.30	0.87	0.79	11.0	5.8	11.4	11.9
FEB 10 71	WED	6	2.279	3.3	1.1	0.33	0.67	0.752	1.527	0.70	1.30	0.93	0.85	10.0	5.6	11.0	
FEB 11 71	THU	6	2.102	3.2	1.1	0.33	0.67	0.654	1.408	0.70	1.30	1.01	0.92	11.0	5.4	10.5	19.3
FEB 12 71	FRI	99	2.027	3.0	1.2	0.33	0.67	0.750	1.522	0.70	1.30	1.02	0.93	11.0	5.3	10.2	
FEB 13 71	SAT	99	2.079	2.9	1.1	0.33	0.67	0.684	1.393	0.70	1.30	0.93	0.85	11.0	5.4	10.4	17.6
FEB 14 71	SUN	6	2.202	3.0	1.2	0.33	0.67	0.727	1.475	0.70	1.30	0.96	0.88	12.0	5.5	10.8	29.0
FEB 15 71	MON	6	2.124	3.0	1.2	0.33	0.67	0.662	1.361	0.70	1.30	0.96	0.88	13.0	5.2	15.2	
FEB 16 71	TUE	6	2.060	3.0	1.1	0.33	0.67	0.602	1.062	0.85	2.85	2.85	2.77	13.0	15.0	15.0	25.2
FEB 17 71	WED	6	2.000	3.0	1.1	0.50	0.50	1.000	1.000	2.85	2.85	2.85	2.85	14.0	19.0	15.0	
FEB 18 71	THU	6	2.000	3.0	1.1	0.50	0.50	1.000	1.000	2.85	2.85	2.85	2.85	14.0	19.0	15.0	19.0
FEB 19 71	FRI	99	1.682	2.9	0.6	0.50	0.50	0.841	0.841	3.90	2.85	3.96	3.96	15.0	18.2	14.1	
FEB 20 71	SAT	99	1.572	2.5	0.6	0.50	0.50	0.786	0.786	3.90	2.85	3.96	3.96	15.0	18.2	14.1	
FEB 21 71	SUN	6	2.229	3.2	0.9	0.50	0.50	1.114	1.114	3.90	2.85	3.96	3.96	16.0	19.4	15.4	20.0
FEB 22 71	MON	6	2.007	3.5	0.7	0.50	0.50	1.003	1.003	3.90	2.85	3.96	3.96	16.0	19.4	15.4	
FEB 23 71	TUE	6	1.911	2.4	0.6	0.50	0.50	0.955	0.955	3.90	2.85	3.96	3.96	15.0	18.8	14.7	28.8
FEB 24 71	WED	6	1.970	3.1	0.6	0.50	0.50	0.985	0.985	3.90	2.85	3.96	3.96	15.0	18.8	14.7	
FEB 25 71	THU	6	1.823	3.0	0.7	0.50	0.50	0.911	0.911	3.90	2.85	3.96	3.96	15.0	18.8	14.7	20.3
FEB 26 71	FRI	99	1.615	2.9	0.5	0.50	0.50	0.807	0.807	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
FEB 27 71	SAT	99	1.546	2.6	0.6	0.50	0.50	0.773	0.773	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
FEB 28 71	SUN	6	1.732	2.6	0.6	0.50	0.50	0.866	0.866	2.85	2.85	3.53	3.53	15.0	18.2	14.2	20.3
MAR 1 71	MON	6	2.352	3.5	1.5	0.50	0.50	1.191	1.191	2.85	2.85	3.53	3.53	15.0	18.2	14.2	23.1
MAR 2 71	TUE	6	2.044	3.7	2.3	0.50	0.50	1.042	1.042	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
MAR 3 71	WED	6	2.617	3.8	1.1	0.50	0.50	1.304	1.304	2.85	2.85	3.53	3.53	15.0	18.2	14.2	20.6
MAR 4 71	THU	6	2.973	4.5	1.2	0.50	0.50	1.489	1.489	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
MAR 5 71	FRI	99	2.675	3.9	1.0	0.50	0.50	1.337	1.337	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
MAR 6 71	SAT	99	2.861	3.6	0.9	0.50	0.50	1.230	1.230	2.85	2.85	3.53	3.53	15.0	18.2	14.2	17.4
MAR 7 71	SUN	6	2.876	4.1	0.9	0.50	0.50	1.438	1.438	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
MAR 8 71	MON	6	2.825	4.0	0.9	0.50	0.50	1.412	1.412	2.85	2.85	3.53	3.53	15.0	18.2	14.2	15.8
MAR 9 71	TUE	6	2.773	4.0	0.9	0.50	0.50	1.386	1.386	2.85	2.85	3.53	3.53	15.0	18.2	14.2	16.6
MAR 10 71	WED	6	2.773	4.2	0.9	0.50	0.50	1.416	1.416	2.85	2.85	3.53	3.53	15.0	18.2	14.2	16.5
MAR 11 71	THU	6	2.584	4.1	0.7	0.50	0.50	1.292	1.292	2.85	2.85	3.53	3.53	15.0	18.2	14.2	40.9
MAR 12 71	FRI	99	2.211	3.6	0.7	0.50	0.50	1.135	1.135	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
MAR 13 71	SAT	99	2.211	3.1	0.8	0.50	0.50	1.075	1.075	2.85	2.85	3.53	3.53	15.0	18.2	14.2	22.0
MAR 14 71	SUN	6	2.817	3.9	1.0	0.50	0.50	1.408	1.408	2.85	2.85	3.53	3.53	15.0	18.2	14.2	15.5
MAR 15 71	MON	6	2.286	4.0	0.7	0.50	0.50	1.143	1.143	2.85	2.85	3.53	3.53	15.0	18.2	14.2	25.2
MAR 16 71	TUE	6	3.031	4.0	0.8	0.50	0.50	1.545	1.545	2.85	2.85	3.53	3.53	15.0	18.2	14.2	
MAR 17 71	WED	6				0.50	0.50			2.85	2.85	3.53	3.53	15.0	18.2	14.2	

Date of Obs	Day of week	Samp Type	Total Flow	Min Flow	PQCT Side 1	PQCT Side 2	Flow Side 1	Flow Side 2	BCBC Side 1	BCBC Side 2	BCBC Ratio 1	BCBC Ratio 2	Temp	HYD Load 1	HYD Load 2	RCD Load 1
MAR 18 71	THU	6	2.700	4.0	0.50	0.50	1.350	1.350	2.85	2.85	2.11	2.11	16.0	16.3	16.3	18.3
MAR 19 71	FRI	99	2.750	4.0	0.50	0.50	1.375	1.375	2.85	2.85	2.07	2.07	16.0	16.3	16.3	18.3
MAR 20 71	SAT	99	2.885	3.6	0.7	0.7	1.222	1.222	2.85	2.85	2.33	2.33	16.0	15.8	15.8	15.8
MAR 21 71	SUN	6	2.217	3.3	0.8	0.8	1.108	1.108	2.85	2.85	2.57	2.57	16.0	15.3	15.3	33.2
MAR 22 71	MON	6	2.694	3.9	0.8	0.8	1.347	1.347	2.85	2.85	2.12	2.12	16.0	16.3	16.3	41.5
MAR 23 71	TUE	6	2.638	4.0	0.7	0.7	1.319	1.319	2.85	2.85	2.20	2.20	16.0	16.2	16.2	41.5
MAR 24 71	WED	6	2.593	3.8	0.7	0.7	1.296	1.296	2.85	2.85	2.17	2.17	16.0	16.1	16.1	42.8
MAR 25 71	THU	6	2.628	3.9	0.8	0.8	1.314	1.314	2.85	2.85	2.17	2.17	15.0	16.1	16.1	15.6
MAR 26 71	FRI	99	2.334	3.5	0.50	0.50	1.167	1.167	2.85	2.85	2.44	2.44	15.5	15.6	15.6	15.2
MAR 27 71	SAT	99	2.168	3.0	0.50	0.50	1.084	1.084	2.85	2.85	2.63	2.63	15.0	15.2	15.2	14.8
MAR 28 71	SUN	6	1.926	3.8	0.8	0.8	0.963	0.963	2.85	2.85	2.96	2.96	18.0	18.8	18.8	16.5
MAR 29 71	MON	6	2.817	3.8	0.8	0.8	1.408	1.408	2.85	2.85	2.02	2.02	18.0	15.8	15.8	20.6
MAR 30 71	TUE	6	2.858	3.5	0.8	0.8	1.229	1.229	2.85	2.85	2.32	2.32	18.0	15.3	15.3	22.2
MAR 31 71	WED	6	2.216	3.1	0.8	0.8	1.108	1.108	2.85	2.85	2.57	2.57	18.0	15.1	15.1	15.1
APR 1 71	THU	6	2.117	3.1	0.7	0.7	1.058	1.058	2.85	2.85	2.69	2.69	18.0	15.1	15.1	15.1
APR 2 71	FRI	99	2.147	3.1	0.7	0.7	1.073	1.073	2.85	2.85	2.65	2.65	15.0	15.2	15.2	15.2
APR 3 71	SAT	99	1.921	2.8	0.8	0.8	0.960	0.960	2.85	2.85	2.97	2.97	18.0	18.8	18.8	16.5
APR 4 71	SUN	6	2.015	2.8	0.8	0.8	1.007	1.007	2.85	2.85	2.81	2.81	15.0	15.0	15.0	15.0
APR 5 71	MON	6	2.920	3.9	0.8	0.8	1.480	1.480	2.85	2.85	1.95	1.95	15.0	16.7	16.7	30.7
APR 6 71	TUE	6	3.539	4.4	1.6	1.6	1.789	1.789	2.85	2.85	1.61	1.61	15.0	17.9	17.9	17.9
APR 7 71	WED	6	3.383	4.2	1.1	1.1	1.541	1.541	2.85	2.85	2.87	2.87	15.0	20.7	20.7	32.4
APR 8 71	THU	6	3.082	4.2	0.7	0.7	1.350	1.350	3.80	3.80	2.41	2.41	16.0	18.9	18.9	6.7
APR 9 71	FRI	99	2.701	4.0	0.50	0.50	1.078	1.078	3.80	3.80	3.53	3.53	16.0	18.7	18.7	6.5
APR 10 71	SAT	99	2.156	3.2	0.7	0.7	1.297	1.297	3.80	3.80	2.93	2.93	17.0	18.8	18.8	7.5
APR 11 71	SUN	6	2.594	3.7	0.9	0.9	1.385	1.385	3.80	3.80	2.74	2.74	17.5	20.1	20.1	7.9
APR 12 71	MON	6	2.770	3.9	0.9	0.9	1.334	1.334	3.80	3.80	2.85	2.85	18.0	19.9	19.9	7.7
APR 13 71	TUE	6	2.668	3.9	0.8	0.8	1.341	1.341	3.80	3.80	2.83	2.83	18.0	19.9	19.9	35.9
APR 14 71	WED	6	2.683	4.1	0.8	0.8	1.314	1.314	3.80	3.80	2.89	2.89	18.0	19.8	19.8	7.6
APR 15 71	THU	99	2.628	4.1	0.8	0.8	1.314	1.314	3.80	3.80	3.44	3.44	18.0	19.0	19.0	6.8
APR 16 71	FRI	99	2.212	3.4	0.7	0.7	1.106	1.106	3.80	3.80	3.66	3.66	18.0	18.7	18.7	6.5
APR 17 71	SAT	99	2.014	3.0	0.7	0.7	1.037	1.037	3.80	3.80	3.01	3.01	19.0	19.6	19.6	7.4
APR 18 71	SUN	6	2.522	3.7	0.8	0.8	1.261	1.261	3.80	3.80	2.95	2.95	19.0	19.7	19.7	29.0
APR 19 71	MON	6	2.573	3.9	0.8	0.8	1.286	1.286	3.80	3.80	2.86	2.86	20.0	19.9	19.9	7.7
APR 20 71	TUE	6	2.653	3.8	0.8	0.8	1.326	1.326	3.80	3.80	3.04	3.04	19.5	19.6	19.6	7.4
APR 21 71	WED	6	2.653	3.8	0.7	0.7	1.327	1.327	3.80	3.80	3.63	3.63	19.5	18.8	18.8	6.6
APR 22 71	THU	99	2.654	4.0	0.7	0.7	1.327	1.327	3.80	3.80	3.05	3.05	19.5	18.6	18.6	25.5
APR 23 71	FRI	99	2.488	3.8	0.7	0.7	1.249	1.249	3.80	3.80	2.91	2.91	19.5	19.6	19.6	7.3
APR 24 71	SAT	99	2.086	3.1	0.50	0.50	0.992	0.992	3.80	3.80	2.69	2.69	20.0	20.2	20.2	32.9
APR 25 71	SUN	6	1.985	2.9	0.6	0.6	1.266	1.266	3.80	3.80	2.83	2.83	20.0	19.9	19.9	7.7
APR 26 71	MON	6	2.492	3.5	1.2	1.2	1.307	1.307	3.80	3.80	2.93	2.93	20.0	19.7	19.7	32.5
APR 27 71	TUE	6	2.614	3.5	0.8	0.8	1.415	1.415	3.80	3.80	2.83	2.83	19.5	18.3	18.3	9.3
APR 28 71	WED	6	2.690	3.6	0.8	0.8	1.345	1.345	3.80	3.80	2.19	2.19	19.5	18.3	18.3	8.8
APR 29 71	THU	6	2.583	3.6	0.7	0.7	1.291	1.291	3.80	3.80	2.47	2.47	20.0	18.9	18.9	9.9
APR 30 71	FRI	99	2.321	3.4	0.7	0.7	1.160	1.160	2.54	2.54	1.96	1.96	20.0	18.7	18.7	9.7
MAY 1 71	SAT	99	2.054	3.2	0.7	0.7	1.027	1.027	2.54	2.54	2.03	2.03	20.0	18.7	18.7	34.3
MAY 2 71	SUN	6	2.549	3.6	0.8	0.8	1.294	1.294	2.54	2.54	1.97	1.97	20.0	18.8	18.8	9.8
MAY 3 71	MON	6	2.549	3.6	0.8	0.8	1.255	1.255	2.54	2.54	2.08	2.08	20.0	18.6	18.6	9.6
MAY 4 71	TUE	6	2.510	3.6	0.8	0.8	1.289	1.289	2.54	2.54	1.26	1.26	21.0	13.7	13.7	8.7
MAY 5 71	WED	99	2.499	3.5	0.7	0.7	1.289	1.289	2.54	2.54	2.55	2.55	21.0	13.6	13.6	8.6
MAY 6 71	THU	6	2.578	3.6	0.7	0.7	1.219	1.219	2.54	2.54	2.63	2.63	21.0	13.6	13.6	31.0
MAY 7 71	FRI	99	2.439	3.6	0.7	0.7	0.995	0.995	2.54	2.54	1.29	1.29	21.0	13.6	13.6	8.6
MAY 8 71	SAT	99	1.990	3.0	0.50	0.50	0.966	0.966	2.54	2.54	1.29	1.29	21.0	13.6	13.6	8.6
MAY 9 71	SUN	6	1.933	2.6	0.6	0.6	0.966	0.966	2.54	2.54	1.29	1.29	21.0	13.6	13.6	8.6

Date of Obsv	Day of Week	Samp Type	Total Flow	Max Flow	Min Flow	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	RCBC Side 1	RCBC Side 2	RCBC Ratio	RCBC Ratio	Temp	HYD Load 1	HYD Load 2	BOD Load
MAY 10 71	MON	99	2,518	3.5	0.7	0.00	1.00	0.000	2.518	0.00	1.25	1.00	0.50	21.0	0.0	14.6	---
MAY 11 71	TUE	99	2,521	3.5	0.8	1.00	0.00	2.521	0.000	0.00	0.00	0.00	1.00	21.5	0.0	9.8	0.0
MAY 12 71	WED	99	2,655	3.5	0.9	0.00	0.00	0.000	0.000	0.00	0.00	1.00	1.00	21.0	0.0	0.0	0.0
MAY 13 71	THU	99	2,827	4.0	0.8	0.50	0.50	1.413	1.413	2.58	2.23	1.81	1.58	21.0	15.5	14.1	13.5
MAY 14 71	FRI	99	2,489	3.7	0.8	0.50	0.50	1.294	1.294	2.58	2.23	2.07	1.79	22.0	14.8	13.5	13.5
MAY 15 71	SAT	99	2,896	3.8	0.9	0.50	0.50	1.468	1.468	2.58	1.25	1.75	0.86	21.5	15.5	10.5	84.8
MAY 16 71	SUN	6	3,250	3.7	1.5	0.50	0.50	1.625	1.625	2.58	1.25	1.56	0.77	21.5	16.1	11.1	---
MAY 17 71	MON	6	3,288	4.1	1.3	0.50	0.50	1.622	1.622	2.58	1.25	1.57	0.77	20.0	16.1	11.1	---
MAY 18 71	TUE	6	2,867	3.8	1.0	0.50	0.50	1.433	1.433	2.58	1.25	1.77	0.87	21.0	15.4	10.4	21.1
MAY 19 71	WED	99	2,799	3.9	1.0	0.50	0.50	1.399	1.399	2.58	1.25	1.81	0.89	21.0	15.3	10.3	35.3
MAY 20 71	THU	6	2,747	3.7	0.9	0.50	0.50	1.373	1.373	2.58	1.25	1.85	0.91	22.0	15.2	10.2	---
MAY 21 71	FRI	99	2,536	3.5	0.9	0.50	0.50	1.288	1.288	2.58	1.25	2.00	0.99	22.5	14.8	9.8	---
MAY 22 71	SAT	99	2,135	3.2	0.8	0.50	0.50	1.069	1.069	2.58	1.25	2.37	1.17	22.0	14.0	9.0	---
MAY 23 71	SUN	6	2,017	3.1	0.8	0.50	0.50	1.008	1.008	2.58	1.25	2.52	1.24	22.0	13.8	8.8	83.4
MAY 24 71	MON	6	2,468	3.6	0.8	0.50	0.50	1.234	1.234	2.58	1.25	2.06	1.01	22.0	14.6	9.6	---
MAY 25 71	TUE	6	2,351	3.5	0.7	0.50	0.50	1.175	1.175	2.58	1.25	2.16	1.06	22.5	14.4	9.4	---
MAY 26 71	WED	6	2,080	3.3	0.8	0.50	0.50	1.040	1.040	2.58	1.25	2.48	1.20	22.5	13.9	8.9	---
MAY 27 71	THU	6	2,021	3.1	0.8	0.50	0.50	1.010	1.010	2.58	1.25	2.51	1.24	22.5	13.8	8.8	27.6
MAY 28 71	FRI	99	3,097	3.6	2.7	0.50	0.50	1.588	1.588	2.58	1.25	1.64	0.81	22.5	15.8	10.8	---
MAY 29 71	SAT	99	2,674	3.1	1.3	0.50	0.50	1.337	1.337	2.58	1.25	1.90	0.93	20.0	15.0	10.0	---
MAY 30 71	SUN	99	4,683	2.9	1.0	0.50	0.50	2.441	2.441	2.58	1.25	1.04	0.51	20.0	14.1	9.1	---
MAY 31 71	MON	6	2,336	3.1	1.0	0.50	0.50	1.168	1.168	2.58	1.25	2.17	1.07	21.0	14.4	9.4	---
JUN 1 71	TUE	6	2,139	3.1	0.8	0.50	0.50	1.069	1.069	2.58	1.25	2.37	1.17	21.0	14.0	9.0	23.0
JUN 2 71	WED	6	2,056	2.9	0.8	0.50	0.50	1.028	1.028	2.58	1.25	2.47	1.21	21.0	13.8	8.8	---
JUN 3 71	THU	6	2,039	3.0	0.7	0.50	0.50	1.019	1.019	2.58	1.25	2.49	1.24	22.0	13.8	8.8	23.6
JUN 4 71	FRI	99	2,021	3.0	0.8	0.50	0.50	1.010	1.010	2.58	1.25	2.51	1.24	22.5	13.8	8.8	---
JUN 5 71	SAT	99	1,759	2.7	0.9	0.50	0.50	0.894	0.894	2.58	1.25	2.84	1.35	22.0	13.3	8.3	---
JUN 6 71	SUN	6	1,770	2.6	0.9	0.50	0.50	0.885	0.885	2.58	1.25	2.87	1.35	23.0	13.3	8.3	---
JUN 7 71	MON	6	2,242	3.1	0.8	0.50	0.50	1.121	1.121	2.58	1.25	2.27	1.08	23.5	14.2	9.2	---
JUN 8 71	TUE	6	2,206	3.4	0.7	0.50	0.50	1.103	1.103	2.58	1.25	2.30	1.10	24.0	14.1	9.1	35.9
JUN 9 71	WED	6	2,189	3.2	0.7	0.50	0.50	1.094	1.094	2.58	1.25	2.32	1.10	24.0	14.1	9.1	---
JUN 10 71	THU	6	2,163	3.1	0.7	0.50	0.50	1.081	1.081	2.58	1.25	2.35	1.10	24.0	14.0	9.0	29.5
JUN 11 71	FRI	99	2,107	3.1	0.7	0.50	0.50	1.053	1.053	2.58	1.25	2.41	1.10	24.0	13.9	8.9	---
JUN 12 71	SAT	99	1,805	2.7	0.7	0.50	0.50	0.902	0.902	2.58	1.25	2.81	1.32	24.0	13.3	8.3	---
JUN 13 71	SUN	6	1,805	2.0	0.5	0.50	0.50	0.902	0.902	2.58	1.25	2.81	1.32	24.0	13.3	8.3	25.6
JUN 14 71	MON	6	1,503	2.5	0.6	0.50	0.50	0.751	0.751	2.58	1.25	3.38	1.99	24.0	12.8	7.8	---
JUN 15 71	TUE	6	1,452	2.3	0.6	0.50	0.50	0.726	0.726	2.58	1.25	3.50	2.13	24.5	12.7	7.7	25.2
JUN 16 71	WED	6	1,453	2.0	0.6	0.50	0.50	0.726	0.726	2.58	1.25	3.50	2.13	24.5	12.7	7.7	---
JUN 17 71	THU	99	1,453	2.4	0.6	0.50	0.50	0.726	0.726	2.58	1.25	3.50	2.13	24.5	12.7	7.7	---
JUN 18 71	FRI	99	1,320	2.2	0.5	0.50	0.50	0.660	0.660	2.58	1.25	3.85	2.25	24.5	12.4	7.4	---
JUN 19 71	SAT	99	1,067	2.0	0.5	0.50	0.50	0.533	0.533	2.58	1.25	4.76	2.62	24.0	11.9	6.9	---
JUN 20 71	SUN	99	0,759	1.9	0.5	0.50	0.50	0.379	0.379	2.58	1.25	6.69	3.91	24.0	11.3	6.3	---
JUN 21 71	MON	99	1,632	2.3	0.6	0.00	1.00	0.000	1.632	0.00	3.00	1.00	1.84	24.0	0.0	0.0	---
JUN 22 71	TUE	6	1,599	2.4	0.6	0.50	0.50	0.799	0.799	2.58	1.25	3.18	1.75	25.0	12.9	7.9	20.1
JUN 23 71	WED	99	2,157	3.0	0.7	0.50	0.50	1.078	1.078	2.58	1.25	3.36	1.80	25.0	14.0	9.0	---
JUN 24 71	THU	6	2,120	3.2	0.7	0.50	0.50	1.060	1.060	2.58	1.25	3.40	1.80	25.0	14.0	9.0	37.8
JUN 25 71	FRI	99	2,053	3.1	0.7	0.50	0.50	1.031	1.031	2.58	1.25	3.46	1.80	25.0	13.8	8.8	---
JUN 26 71	SAT	6	1,792	2.8	0.7	0.50	0.50	0.896	0.896	2.58	1.25	3.83	2.17	25.5	13.3	8.3	16.9
JUN 27 71	SUN	99	1,328	3.7	0.7	0.50	0.50	0.664	0.664	2.58	1.25	4.10	2.32	25.5	12.4	7.4	---
JUN 28 71	MON	6	1,367	2.5	0.5	0.50	0.50	0.683	0.683	2.58	1.25	4.10	2.32	25.5	12.5	7.5	---
JUN 29 71	TUE	6	2,027	2.0	0.5	0.50	0.50	1.013	1.013	2.58	1.25	4.10	2.32	25.5	11.8	6.8	25.5
JUN 30 71	WED	6	2,196	3.2	0.7	0.50	0.50	1.098	1.098	2.58	1.25	4.10	2.32	25.5	14.1	9.1	---
JUL 1 71	THU	6	2,290	3.2	0.8	0.50	0.50	1.145	1.145	2.58	1.25	4.10	2.32	25.5	14.1	9.1	---

Date of Obsv	Day of Week	Stamp Time	Total Flow	Max Flow	Min Flow	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	RCRC Side 1	RCRC Side 2	RCRC Ratio 1	RCRC Ratio 2	Temp	HYD Load 1	HYD Load 2	BOD Load
JUL 2 71	FRI	99	2.050	3.1	0.7	0.50	0.50	1.025	1.025	2.54	4.10	2.48	0.00	25.5	13.8	19.9	---
JUL 3 71	SAT	99	1.717	2.5	0.6	0.50	0.50	0.858	0.858	2.54	4.10	2.96	4.78	25.5	13.2	19.2	---
JUL 4 71	SUN	99	1.484	2.3	0.6	0.50	0.50	0.742	0.742	2.54	4.10	3.42	5.53	25.5	12.7	18.8	---
JUL 5 71	MON	6	1.863	2.9	0.6	0.50	0.50	0.931	0.931	2.94	4.20	2.73	9.88	25.0	13.5	38.3	22.5
JUL 6 71	TUE	6	2.258	3.5	0.7	0.50	0.50	1.129	1.129	2.93	4.20	2.60	3.72	26.0	15.7	20.7	22.5
JUL 7 71	WED	6	2.184	3.2	0.7	0.50	0.50	1.072	1.072	2.93	4.20	2.67	3.92	26.0	15.7	20.4	21.9
JUL 8 71	THU	6	2.192	3.4	0.7	0.50	0.50	1.096	1.096	2.93	4.20	2.67	3.83	26.0	15.6	20.5	21.9
JUL 9 71	FRI	99	2.092	3.3	0.7	0.50	0.50	1.046	1.046	2.93	4.20	3.30	3.25	26.0	15.4	17.2	20.4
JUL 10 71	SAT	6	1.763	2.6	0.7	0.50	0.50	0.881	0.881	2.93	4.20	3.32	3.86	26.0	14.8	16.6	20.4
JUL 11 71	SUN	99	1.697	2.5	0.7	0.50	0.50	0.848	0.848	2.93	4.20	3.65	4.01	26.0	14.6	16.5	20.4
JUL 12 71	MON	6	2.078	3.0	0.6	0.50	0.50	1.039	1.039	4.00	3.40	3.88	3.30	26.0	19.5	17.2	17.2
JUL 13 71	TUE	6	2.062	3.3	0.7	0.50	0.50	1.031	1.031	4.00	3.40	3.81	3.34	26.0	19.4	17.1	17.1
JUL 14 71	WED	6	2.037	3.0	0.7	0.50	0.50	1.018	1.018	4.00	3.40	3.93	3.34	26.5	19.4	17.1	17.1
JUL 15 71	THU	6	2.026	3.1	0.7	0.50	0.50	1.013	1.013	4.00	3.40	3.36	3.36	26.5	17.1	17.1	35.3
JUL 16 71	FRI	99	1.711	2.6	0.7	0.50	0.50	0.855	0.855	3.40	3.40	3.97	3.37	26.5	16.3	16.3	25.2
JUL 17 71	SAT	6	1.711	2.6	0.7	0.50	0.50	0.797	0.797	3.40	3.40	4.26	4.26	26.5	16.3	16.3	25.2
JUL 18 71	SUN	99	1.595	2.4	0.6	0.50	0.50	0.702	0.702	3.40	3.40	3.33	3.33	27.0	17.1	17.1	21.3
JUL 19 71	MON	6	2.043	3.0	0.7	0.50	0.50	1.021	1.021	3.40	3.40	3.36	3.36	27.0	17.1	17.1	21.3
JUL 20 71	TUE	6	2.025	3.0	0.6	0.50	0.50	1.012	1.012	3.40	3.40	3.34	3.34	27.0	17.1	17.1	21.3
JUL 21 71	WED	6	2.035	3.3	0.6	0.50	0.50	1.017	1.017	3.40	3.40	3.35	3.35	27.0	17.1	17.1	27.2
JUL 22 71	THU	6	2.030	3.0	0.7	0.50	0.50	1.015	1.015	3.40	3.40	3.60	3.60	26.5	16.8	16.8	12.0
JUL 23 71	FRI	99	1.891	3.0	0.7	0.50	0.50	0.945	0.945	3.40	3.40	4.03	4.03	26.5	16.4	16.4	12.0
JUL 24 71	SAT	6	1.688	2.5	0.6	0.50	0.50	0.844	0.844	3.40	3.40	4.43	4.43	26.0	16.2	16.2	12.0
JUL 25 71	SUN	99	1.535	2.3	0.6	0.50	0.50	0.767	0.767	3.40	3.40	3.24	3.24	26.0	17.2	17.2	20.0
JUL 26 71	MON	6	2.098	3.0	0.7	0.50	0.50	1.049	1.049	3.40	3.40	3.38	3.38	26.5	17.1	17.1	20.0
JUL 27 71	TUE	6	2.010	4.0	0.8	0.50	0.50	1.005	1.005	3.40	3.40	3.37	3.37	26.5	17.1	17.1	32.8
JUL 28 71	WED	6	2.015	3.1	0.9	0.50	0.50	1.007	1.007	3.40	3.40	3.10	3.10	27.0	17.4	17.4	32.8
JUL 29 71	THU	6	2.191	3.5	0.7	0.50	0.50	1.095	1.095	3.40	3.40	3.05	3.05	27.0	17.6	17.6	17.5
JUL 30 71	FRI	99	2.286	4.5	0.8	0.50	0.50	1.113	1.113	3.40	3.40	3.64	3.64	25.5	16.8	16.8	17.5
JUL 31 71	SAT	99	2.226	4.5	0.8	0.50	0.50	0.945	0.945	3.40	3.40	2.97	2.97	27.0	17.5	17.5	17.5
AUG 1 71	SUN	99	2.404	3.5	0.9	0.50	0.50	1.202	1.202	3.40	3.40	2.90	2.90	27.0	17.7	17.7	23.4
AUG 2 71	MON	6	2.398	3.6	0.9	0.50	0.50	1.174	1.174	3.40	3.40	2.90	2.90	27.0	17.7	17.7	23.4
AUG 3 71	TUE	6	2.441	3.4	1.4	0.50	0.50	1.220	1.220	3.40	3.40	2.99	2.99	26.0	17.6	17.6	19.1
AUG 4 71	WED	6	2.278	3.4	1.4	0.50	0.50	1.139	1.139	3.40	3.40	3.27	3.27	26.0	17.2	17.2	19.1
AUG 5 71	THU	6	2.082	3.3	0.9	0.50	0.50	1.041	1.041	3.40	3.40	3.83	3.83	27.0	16.6	16.6	16.6
AUG 6 71	FRI	99	1.775	3.3	0.8	0.50	0.50	0.887	0.887	3.40	3.40	4.17	4.17	26.0	16.3	16.3	16.3
AUG 7 71	SAT	99	1.631	2.6	0.8	0.50	0.50	0.815	0.815	3.40	3.40	4.35	4.35	25.0	17.1	17.1	21.3
AUG 8 71	SUN	99	2.027	2.5	0.7	0.50	0.50	1.013	1.013	3.40	3.40	4.11	4.11	25.0	16.4	16.4	21.3
AUG 9 71	MON	6	1.655	3.1	0.6	0.50	0.50	0.827	0.827	3.40	3.40	3.11	3.11	27.0	17.2	17.2	30.9
AUG 10 71	TUE	6	2.198	3.0	0.8	0.50	0.50	1.094	1.094	3.40	3.40	3.24	3.24	25.0	17.2	17.2	30.9
AUG 11 71	WED	6	2.100	3.0	0.8	0.50	0.50	1.050	1.050	3.40	3.40	3.48	3.48	25.0	17.0	17.0	15.0
AUG 12 71	THU	99	1.955	3.2	0.7	0.50	0.50	0.977	0.977	3.40	3.40	3.82	3.82	26.0	16.6	16.6	15.0
AUG 13 71	FRI	99	1.781	2.6	0.8	0.50	0.50	0.890	0.890	3.40	3.40	4.23	4.23	25.0	16.3	16.3	15.0
AUG 14 71	SAT	6	1.607	2.5	0.7	0.50	0.50	0.803	0.803	3.40	3.40	3.40	3.40	24.0	17.1	17.1	35.5
AUG 15 71	SUN	99	2.001	3.0	0.7	0.50	0.50	1.000	1.000	3.40	3.40	2.42	2.42	23.0	18.6	18.6	35.5
AUG 16 71	MON	6	2.014	3.7	2.2	0.50	0.50	1.407	1.407	3.40	3.40	2.66	2.66	24.0	18.1	18.1	27.3
AUG 17 71	TUE	6	2.555	4.0	0.9	0.50	0.50	1.277	1.277	3.40	3.40	3.14	3.14	23.0	17.4	17.4	27.3
AUG 18 71	WED	6	2.167	3.4	0.8	0.50	0.50	1.043	1.043	3.40	3.40	3.38	3.38	26.0	17.1	17.1	17.1
AUG 19 71	THU	6	2.010	3.1	0.6	0.50	0.50	1.005	1.005	3.40	3.40	3.61	3.61	26.5	15.3	15.3	15.3
AUG 20 71	FRI	99	1.100	2.3	0.7	0.50	0.50	0.550	0.550	3.40	3.40	3.60	3.60	26.5	16.8	16.8	16.8
AUG 21 71	SAT	6	1.489	3.6	1.1	0.50	0.50	0.944	0.944	3.40	3.40	3.15	3.15	25.5	17.4	17.4	17.4
AUG 22 71	SUN	99	2.157	3.3	0.7	0.50	0.50	1.078	1.078	3.40	3.40	3.15	3.15	25.5	17.4	17.4	17.4
AUG 23 71	MON	6															

Date of Obsv	Day of Week	Samp Type	Total Flow	Max Flow	Min Flow	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	RCRC Side 1	RCRC Side 2	RCRC Ratio 1	RCRC Ratio 2	Temp	HYD Load 1	HYD Load 2	BOD Load 1
AUG 24 71	TUE	6	2.378	3.1	0.7	0.50	0.50	1.189	1.189	3.40	3.00	2.86	2.52	25.0	17.8	16.2	25.0
AUG 25 71	WED	6	0.662	1.0	1.0	0.50	0.50	0.331	0.331	3.40	3.00	0.27	9.06	26.0	14.5	12.9	14.6
AUG 26 71	THU	6	1.089	3.1	1.0	0.50	0.50	0.544	0.544	3.40	3.40	0.24	6.24	26.5	15.3	15.3	14.6
AUG 27 71	FRI	99	0.809	1.0	1.0	0.50	0.50	0.204	0.204	3.40	3.30	0.23	6.14	26.5	14.0	13.6	2.2
AUG 28 71	SAT	6	0.193	1.0	1.0	0.50	0.50	0.096	0.096	3.40	3.30	0.23	6.14	26.0	13.6	13.6	2.2
AUG 29 71	SUN	99	0.144	1.0	1.0	0.50	0.50	0.072	0.072	3.40	3.30	0.22	5.83	26.5	13.5	13.1	
AUG 30 71	MON	6	1.620	3.9	0.6	0.50	0.50	0.810	0.810	3.40	3.30	0.20	4.07	26.0	15.3	15.9	
AUG 31 71	TUE	6	0.980	1.0	1.0	0.50	0.50	0.890	0.890	3.40	3.30	0.20	4.07	26.0	15.3	15.9	13.6
SEP 1 71	WED	6	2.105	4.4	0.9	0.50	0.50	1.052	1.052	3.40	3.25	0.23	3.09	26.5	17.3	16.7	
SEP 2 71	THU	6	3.063	4.4	0.9	0.50	0.50	1.531	1.531	3.40	3.25	0.22	2.12	26.5	19.1	18.5	80.8
SEP 3 71	FRI	99	2.799	4.0	1.0	0.50	0.50	1.399	1.399	3.40	3.25	0.23	2.32	27.0	18.6	18.0	
SEP 4 71	SAT	99	2.553	4.1	0.9	0.50	0.50	1.276	1.276	3.40	3.40	0.20	2.66	27.0	18.6	18.0	
SEP 5 71	SUN	99	2.498	3.6	0.9	0.50	0.50	1.249	1.249	3.40	3.40	0.20	2.72	26.0	18.0	18.1	
SEP 6 71	MON	99	2.864	4.0	1.0	0.50	0.50	1.432	1.432	3.40	3.40	0.23	1.68	26.5	18.7	18.9	
SEP 7 71	TUE	6	2.984	4.8	0.9	0.50	0.50	1.492	1.492	3.40	3.40	0.22	1.61	26.5	19.0	15.1	52.5
SEP 8 71	WED	6	3.059	4.4	1.0	0.50	0.50	1.529	1.529	2.93	2.93	0.23	1.92	27.0	17.3	17.3	
SEP 9 71	THU	99	3.215	5.0	0.9	0.50	0.50	1.532	1.532	2.93	2.93	0.23	1.91	27.0	17.3	17.3	51.5
SEP 10 71	FRI	99	3.064	4.7	0.9	0.50	0.50	1.617	1.617	2.93	2.93	0.23	1.81	27.0	17.6	17.6	
SEP 11 71	SAT	6	3.184	4.5	0.9	0.50	0.50	1.592	1.592	2.93	2.93	0.23	1.84	27.0	17.5	17.5	40.1
SEP 12 71	SUN	99	4.224	6.5	2.0	0.50	0.50	2.112	2.112	2.93	2.93	0.23	1.39	25.0	19.5	19.5	
SEP 13 71	MON	6	3.757	5.1	1.6	0.50	0.50	1.978	1.978	2.93	2.93	0.23	1.56	25.0	18.6	18.6	
SEP 14 71	TUE	99	3.450	5.7	1.1	0.50	0.50	1.725	1.725	2.93	2.93	0.23	1.70	25.0	18.0	18.0	
SEP 15 71	WED	6	3.262	4.1	1.2	0.50	0.50	1.631	1.631	2.93	2.93	0.23	1.80	25.0	17.7	17.7	
SEP 16 71	THU	6	3.169	4.5	1.1	0.50	0.50	1.584	1.584	2.93	2.93	0.23	1.85	26.5	17.5	17.5	47.4
SEP 17 71	FRI	99	3.064	4.5	1.1	0.50	0.50	1.534	1.534	2.93	2.93	0.23	1.91	26.5	17.3	17.3	
SEP 18 71	SAT	6	2.631	4.1	1.0	0.50	0.50	1.375	1.375	2.93	2.93	0.23	2.23	26.0	16.5	16.5	30.4
SEP 19 71	SUN	99	2.519	3.6	1.0	0.50	0.50	1.269	1.269	2.93	2.93	0.23	2.31	26.0	16.3	16.3	
SEP 20 71	MON	6	3.121	4.5	1.0	0.50	0.50	1.560	1.560	2.93	2.93	0.23	1.88	26.0	17.4	17.4	54.0
SEP 21 71	TUE	6	3.959	5.9	2.0	0.50	0.50	1.979	1.979	2.93	2.93	0.23	1.48	27.0	19.0	19.0	
SEP 22 71	WED	6	3.592	4.9	1.1	0.50	0.50	1.796	1.796	2.93	2.93	0.23	1.63	28.5	18.3	18.3	55.3
SEP 23 71	THU	6	3.455	4.9	1.2	0.50	0.50	1.727	1.727	2.93	2.93	0.23	1.70	25.0	18.1	18.1	
SEP 24 71	FRI	99	3.290	4.5	1.0	0.50	0.50	1.645	1.645	2.93	2.93	0.23	1.78	25.0	17.7	17.7	60.5
SEP 25 71	SAT	6	2.953	5.3	1.0	0.50	0.50	1.476	1.476	2.93	2.93	0.23	1.98	25.0	16.7	16.7	
SEP 26 71	SUN	99	2.784	3.9	1.0	0.50	0.50	1.372	1.372	2.93	2.93	0.23	2.14	25.0	16.7	16.7	13.2
SEP 27 71	MON	6	3.156	4.8	1.0	0.50	0.50	1.578	1.578	2.93	2.93	0.23	1.86	25.0	17.5	17.5	14.0
SEP 28 71	TUE	99	3.147	4.9	1.0	0.50	0.50	1.573	1.573	2.93	2.93	0.23	1.86	25.0	17.5	17.5	
SEP 29 71	WED	99	3.007	4.6	0.9	0.50	0.50	1.503	1.503	2.93	2.93	0.23	1.95	27.0	17.2	17.2	13.7
SEP 30 71	THU	6	3.392	4.8	1.0	0.50	0.50	1.496	1.496	2.93	2.93	0.23	1.73	25.0	17.9	17.9	49.0
OCT 1 71	FRI	99	4.022	5.6	1.2	0.50	0.50	2.811	2.811	2.93	2.93	0.23	1.20	25.0	20.7	20.7	
OCT 2 71	SAT	6	3.846	5.6	1.1	0.50	0.50	1.923	1.923	2.93	2.93	0.23	1.52	26.0	18.8	18.8	53.5
OCT 3 71	SUN	99	3.170	5.0	1.4	0.50	0.50	1.585	1.585	2.93	2.93	0.23	1.85	26.0	17.5	17.5	
OCT 4 71	MON	6	3.486	5.0	1.4	0.50	0.50	1.743	1.743	2.93	2.93	0.23	1.66	25.0	18.0	18.0	55.1
OCT 5 71	TUE	6	3.962	5.0	1.3	0.50	0.50	1.981	1.981	2.93	2.93	0.23	1.88	25.0	19.0	19.0	
OCT 6 71	WED	6	4.351	5.3	1.9	0.50	0.50	2.175	2.175	2.93	2.93	0.23	1.35	28.0	19.8	19.8	
OCT 7 71	THU	99	3.643	5.0	1.3	0.50	0.50	1.821	1.821	2.93	2.93	0.23	1.61	25.0	18.4	18.4	
OCT 8 71	FRI	99	3.359	4.9	1.0	0.50	0.50	1.679	1.679	2.93	2.93	0.23	1.74	23.0	17.9	17.9	16.8
OCT 9 71	SAT	99	3.610	5.1	2.4	0.50	0.50	1.805	1.805	2.93	2.93	0.23	1.62	23.0	18.4	18.4	
OCT 10 71	SUN	6	4.222	5.0	2.4	0.50	0.50	2.111	2.111	2.93	2.93	0.23	1.39	22.0	19.5	19.5	26.6
OCT 11 71	MON	6	3.827	4.8	1.3	0.50	0.50	1.913	1.913	2.93	2.93	0.23	1.53	23.0	18.6	18.6	
OCT 12 71	TUE	6	3.621	4.2	1.4	0.50	0.50	1.810	1.810	2.93	2.93	0.23	1.62	22.0	18.4	18.4	55.1
OCT 13 71	WED	6	3.455	1.0	1.0	0.50	0.50	1.727	1.727	2.93	2.93	0.23	1.70	22.0	18.1	18.1	
OCT 14 71	THU	6	3.400	4.7	1.1	0.50	0.50	1.700	1.700	2.93	2.93	0.23	1.72	23.0	17.9	17.9	14.4
OCT 15 71	FRI	99	3.061	4.7	1.0	0.50	0.50	1.530	1.530	2.93	2.93	0.23	1.91	22.5	17.3	17.3	53.5

Date of Obsv	Day of Week	Samp Type	Total Flow	Max Flow	Min Flow	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	RCBC Side 1	RCBC Side 2	RCBC Ratio 1	RCBC Ratio 2	Temp	HYD Load 1	HYD Load 2	MOD Load 1
OCT 16 71	SAT	6	2,687	3.2	1.0	0.50	0.50	1.343	1.343	2.93	2.00	2.18	1.99	28.0	16.6	13.0	21.9
OCT 17 71	SUN	99	2,555	3.4	0.9	0.50	0.50	1,277	1,277	2.93	2.00	2.29	1.57	23.0	16.3	12.7	
OCT 18 71	MON	6	3,173	4.5	1.0	0.50	0.50	1,586	1,586	2.93	2.00	1.85	1.26	23.0	17.5	13.9	
OCT 19 71	TUE	6	3,316	4.8	1.1	0.50	0.50	1,658	1,658	2.93	2.00	1.77	1.21	23.5	17.8	18.2	
OCT 20 71	WED	6	3,262	4.5	1.1	0.50	0.50	1,631	1,631	2.93	2.00	1.80	1.23	24.5	17.7	18.1	46.8
OCT 21 71	THU	6	2,999	4.4	1.1	0.50	0.50	1,899	1,899	2.93	2.00	1.95	1.33	28.0	17.2	13.6	
OCT 22 71	FRI	99	4,190	4.5	2.3	0.50	0.50	2,095	2,095	2.93	2.00	1.40	0.95	28.0	19.5	15.9	39.4
OCT 23 71	SAT	6	4,292	5.5	2.3	0.50	0.50	2,186	2,186	2.93	2.00	1.37	0.82	23.0	19.7	16.1	
OCT 24 71	SUN	99	4,870	5.0	4.6	0.50	0.50	2,435	2,435	2.93	2.00	1.33	0.80	23.0	20.8	17.2	
OCT 25 71	MON	99	4,800	6.0	2.5	0.50	0.50	2,200	2,200	2.93	2.00	1.00	0.00	23.0	19.9	8.5	
OCT 26 71	TUE	99	4,249	5.4	2.0	0.00	1.00	0,000	0,000	0.00	0.00	1.00	0.00	23.0	0.0	22.4	
OCT 27 71	WED	99	3,790	5.1	1.6	0.00	1.00	0,000	0,000	0.00	0.00	1.00	0.51	23.0	0.0	22.4	
OCT 28 71	THU	99	3,720	5.5	1.3	0.50	0.50	1,860	1,860	2.93	2.00	1.16	1.08	23.0	15.5	15.0	
OCT 29 71	FRI	99	3,382	4.9	1.2	0.50	0.50	1,691	1,691	2.93	2.93	1.73	1.73	23.5	17.9	17.9	
OCT 30 71	SAT	99	3,091	5.2	1.0	0.50	0.50	1,545	1,545	2.93	2.93	1.90	1.90	23.5	17.3	17.3	
OCT 31 71	SUN	99	2,909	4.3	1.1	0.50	0.50	1,454	1,454	2.93	2.93	2.01	1.70	28.0	17.0	15.2	
NOV 1 71	MON	6	3,399	5.0	1.0	0.50	0.50	1,699	1,699	2.94	2.56	1.73	1.51	28.0	18.0	16.5	45.2
NOV 2 71	TUE	6	3,360	4.6	1.0	0.50	0.50	1,690	1,690	2.94	2.56	1.74	1.51	28.5	17.9	16.5	
NOV 3 71	WED	6	3,489	5.0	0.9	0.50	0.50	1,824	1,824	2.94	2.56	1.61	1.40	25.0	18.5	17.0	
NOV 4 71	THU	99	3,358	4.6	1.0	0.50	0.50	1,679	1,679	2.94	2.56	1.75	1.52	28.5	17.9	16.4	
NOV 5 71	FRI	99	3,201	4.5	0.9	0.50	0.50	1,600	1,600	2.94	2.94	1.84	1.84	24.0	17.6	17.6	
NOV 6 71	SAT	99	3,201	4.5	0.9	0.50	0.50	1,600	1,600	2.94	2.94	1.95	1.95	23.0	17.2	17.2	
NOV 7 71	SUN	99	2,012	5.1	0.9	0.50	0.50	1,506	1,506	2.94	2.94	2.14	2.14	23.0	16.7	16.7	
NOV 8 71	MON	99	2,754	4.0	0.9	0.50	0.50	1,377	1,377	2.94	2.94	1.86	1.86	23.0	17.5	17.5	
NOV 9 71	TUE	99	3,158	4.4	0.9	0.50	0.50	1,579	1,579	2.94	2.94	1.93	1.93	22.0	17.3	17.3	
NOV 10 71	WED	6	2,981	4.5	0.9	0.50	0.50	1,526	1,526	2.94	2.94	2.00	2.00	22.0	17.1	17.1	
NOV 11 71	THU	6	2,981	4.2	0.9	0.50	0.50	1,471	1,471	2.94	2.94	1.89	1.89	21.5	17.4	17.4	44.9
NOV 12 71	FRI	99	3,109	4.3	0.9	0.50	0.50	1,554	1,554	2.94	2.94	2.05	2.05	21.5	17.0	17.0	
NOV 13 71	SAT	6	2,878	4.5	0.9	0.50	0.50	1,434	1,434	2.94	2.94	2.38	2.38	21.5	16.2	16.2	40.3
NOV 14 71	SUN	99	2,509	3.4	0.8	0.50	0.50	1,237	1,237	2.94	2.94	2.34	2.34	21.5	16.3	16.3	
NOV 15 71	MON	6	3,106	4.5	1.0	0.50	0.50	1,553	1,553	2.94	2.94	1.89	1.89	21.5	17.4	17.4	
NOV 16 71	TUE	6	3,032	4.3	0.7	0.50	0.50	1,516	1,516	2.94	2.94	1.94	1.94	22.0	17.3	17.3	47.0
NOV 17 71	WED	6	3,035	4.3	0.7	0.50	0.50	1,517	1,517	2.94	2.94	1.94	1.94	22.0	17.3	17.3	44.0
NOV 18 71	THU	6	3,049	4.9	0.8	0.50	0.50	1,524	1,524	2.94	2.94	1.96	1.96	21.5	17.2	17.2	
NOV 19 71	FRI	99	2,997	4.2	0.9	0.50	0.50	1,498	1,498	2.94	2.94	2.23	2.23	22.0	16.5	16.5	
NOV 20 71	SAT	6	2,639	4.4	0.8	0.50	0.50	1,319	1,319	2.94	2.94	2.33	2.33	22.0	16.3	16.3	
NOV 21 71	SUN	99	2,523	3.8	0.7	0.50	0.50	1,261	1,261	2.94	2.94	2.94	2.94	20.0	17.1	17.1	
NOV 22 71	MON	6	2,964	4.5	0.8	0.50	0.50	1,482	1,482	2.94	2.94	1.98	1.98	20.0	16.9	16.9	
NOV 23 71	TUE	6	2,359	4.0	0.8	0.50	0.50	1,179	1,179	2.94	2.94	2.94	2.94	20.0	16.0	16.0	
NOV 24 71	WED	99	2,020	3.3	0.9	0.50	0.50	1,010	1,010	2.94	2.94	2.91	2.91	19.0	15.3	15.3	
NOV 25 71	THU	99	2,167	3.3	0.9	0.50	0.50	1,083	1,083	2.94	2.94	2.29	2.29	19.0	15.6	15.6	39.2
NOV 26 71	FRI	99	2,572	3.8	1.0	0.50	0.50	1,286	1,286	2.94	2.94	2.32	2.32	18.0	16.4	16.4	
NOV 27 71	SAT	6	2,572	3.3	1.1	0.50	0.50	1,266	1,266	2.94	2.94	1.80	1.80	19.0	16.3	16.3	
NOV 28 71	SUN	99	2,260	4.4	1.1	0.50	0.50	1,630	1,630	2.94	2.94	1.85	1.85	19.0	17.7	17.7	
NOV 29 71	MON	6	3,183	4.3	0.9	0.50	0.50	1,591	1,591	2.94	2.94	1.85	1.85	19.0	17.6	17.6	
NOV 30 71	TUE	15	3,103	4.0	1.0	0.50	0.50	1,551	1,551	2.94	2.94	1.92	1.92	19.0	17.4	17.4	48.3
DEC 1 71	WED	15	3,065	4.1	0.9	0.50	0.50	1,532	1,532	2.94	2.94	1.91	1.91	18.5	17.3	17.3	
DEC 2 71	THU	15	3,072	4.0	1.0	0.50	0.50	1,536	1,536	2.94	2.94	1.99	1.99	18.0	17.1	17.1	45.7
DEC 3 71	FRI	99	2,950	4.0	1.0	0.50	0.50	1,475	1,475	2.94	2.94	2.11	2.11	18.0	16.8	16.8	
DEC 4 71	SAT	15	2,786	3.8	1.0	0.50	0.50	1,393	1,393	2.94	2.94	1.87	1.87	19.0	17.5	17.5	
DEC 5 71	SUN	99	3,146	4.1	0.9	0.50	0.50	1,573	1,573	2.94	2.94	1.77	1.77	19.0	17.8	17.8	44.4
DEC 6 71	MON	15	3,315	4.0	1.0	0.50	0.50	1,657	1,657	2.94	2.94						
DEC 7 71	TUE	15															

Date of Obs	Day of Week	Sam Type	Total Plo	Max Plo	Min Plo	PRCT Side 1	PRCT Side 2	Flow Side 1	Flow Side 2	RCRC Side 1	RCRC Side 2	RCRC Ratio 1	RCRC Ratio 2	Temp	HYD Load 1	HYD Load 2	BCD Load 1
DEC 8 71	WED	15	3.227	4.0	1.2	0.50	0.50	1.613	1.613	2.94	2.94	1.82	1.82	15.5	17.6	17.6	--
DEC 9 71	THU	15	2.962	4.1	0.9	0.50	0.50	1.481	1.481	2.94	2.94	1.99	1.99	15.5	17.1	17.1	51.3
DEC 10 71	FRI	99	2.867	4.1	0.7	0.50	0.50	1.433	1.433	2.94	2.94	2.05	2.05	20.0	17.0	17.0	41.1
DEC 11 71	SAT	15	2.806	3.6	0.8	0.50	0.50	1.203	1.203	2.94	2.94	2.44	2.44	20.0	16.1	16.1	
DEC 12 71	SUN	99	2.855	3.4	0.9	0.50	0.50	1.227	1.227	2.94	2.94	2.40	2.40	20.0	16.2	16.2	
DEC 13 71	MON	15	2.878	3.4	0.8	0.50	0.50	1.439	1.439	2.94	2.94	2.04	2.04	20.0	17.0	17.0	
DEC 14 71	TUE	15	2.812	3.9	0.8	0.50	0.50	1.406	1.406	2.94	2.94	2.09	2.09	20.0	16.8	16.8	
DEC 15 71	WED	15	2.750	3.9	0.8	0.50	0.50	1.375	1.375	2.94	2.94	2.14	2.14	20.5	16.7	16.7	50.5
DEC 16 71	THU	99	2.791	4.0	1.0	0.50	0.50	1.395	1.395	2.94	2.94	2.11	2.11	21.0	16.8	16.8	
DEC 17 71	FRI	99	2.308	3.7	0.9	0.50	0.50	1.554	1.554	2.94	2.94	2.55	2.55	19.5	15.9	15.9	
DEC 18 71	SAT	15	3.129	3.2	1.0	0.50	0.50	1.564	1.564	2.94	2.94	1.88	1.88	18.5	17.5	17.5	
DEC 19 71	SUN	99	2.783	4.0	1.3	0.50	0.50	1.391	1.391	2.94	2.94	2.37	2.37	19.0	16.2	16.2	
DEC 20 71	MON	15	2.481	3.8	0.9	0.50	0.50	1.240	1.240	2.94	2.94	2.78	2.78	18.5	15.5	15.5	
DEC 21 71	TUE	99	2.113	3.5	0.9	0.50	0.50	1.056	1.056	2.94	2.94	3.17	3.17	18.0	15.0	15.0	
DEC 22 71	WED	99	1.856	3.0	0.7	0.50	0.50	0.928	0.928	2.94	2.94	3.23	3.23	18.5	14.9	14.9	
DEC 23 71	THU	99	1.818	2.5	0.8	0.50	0.50	0.909	0.909	2.94	2.94	5.87	5.87	19.0	13.3	13.3	
DEC 24 71	FRI	99	1.002	1.9	0.7	0.50	0.50	0.501	0.501	2.94	2.94	4.03	4.03	19.0	14.2	14.2	
DEC 25 71	SAT	99	1.459	2.0	0.6	0.50	0.50	0.729	0.729	2.94	2.94	3.57	3.57	19.5	14.5	14.5	
DEC 26 71	SUN	99	1.613	2.5	0.6	0.50	0.50	0.806	0.806	2.94	2.94	3.46	3.46	18.0	14.6	14.6	21.6
DEC 27 71	MON	99	1.647	2.6	0.7	0.50	0.50	0.823	0.823	2.94	2.94	3.57	3.57	19.0	14.7	14.7	
DEC 28 71	TUE	15	1.700	3.7	0.7	0.50	0.50	0.850	0.850	2.94	2.94	3.34	3.34	18.0	14.8	14.8	31.5
DEC 29 71	WED	15	1.763	2.6	0.8	0.50	0.50	0.881	0.881	2.94	2.94	3.26	3.26	18.0	14.9	14.9	
DEC 30 71	THU	99	1.804	2.8	0.7	0.50	0.50	0.902	0.902	2.94	2.94	4.00	4.00	18.0	14.2	14.2	
JAN 1 72	FRI	99	1.465	2.3	2.6	0.50	0.50	0.732	0.732	2.93	2.93	3.75	3.75	17.5	14.4	14.4	
JAN 2 72	SAT	99	1.561	1.0	1.0	0.50	0.50	0.780	0.780	2.93	2.93	3.26	3.26	17.0	14.8	14.8	32.4
JAN 3 72	SUN	99	1.795	2.8	0.8	0.50	0.50	0.880	0.880	2.93	2.93	2.99	2.99	18.0	15.2	15.2	
JAN 4 72	MON	15	1.960	2.9	0.8	0.50	0.50	0.980	0.980	2.93	2.93	2.88	2.88	17.0	15.3	15.3	
JAN 5 72	TUE	15	2.024	2.9	0.8	0.50	0.50	1.012	1.012	2.93	2.93	3.16	3.16	17.0	15.0	15.0	34.2
JAN 6 72	WED	15	1.855	2.9	0.6	0.50	0.50	0.927	0.927	2.93	2.93	3.04	3.04	16.5	15.1	15.1	
JAN 7 72	THU	99	1.925	2.7	0.8	0.50	0.50	0.859	0.859	2.93	2.93	3.77	3.77	17.0	17.8	17.8	
JAN 8 72	FRI	99	1.718	2.5	0.6	0.50	0.50	0.962	0.962	2.93	2.93	1.77	1.77	17.0	17.7	17.7	27.7
JAN 9 72	SAT	99	1.925	2.7	0.8	0.50	0.50	1.018	1.018	2.93	2.93	1.78	1.78	17.0	17.4	17.4	
JAN 10 72	SUN	99	1.311	4.1	1.3	0.50	0.50	1.055	1.055	2.93	2.93	1.88	1.88	18.0	18.0	18.0	
JAN 11 72	MON	15	3.293	4.3	1.3	0.50	0.50	1.557	1.557	2.93	2.93	1.72	1.72	18.0	17.4	17.4	
JAN 12 72	TUE	15	3.114	4.2	1.1	0.50	0.50	1.707	1.707	2.93	2.93	1.86	1.86	18.0	17.4	17.4	32.6
JAN 13 72	WED	15	3.414	4.2	1.2	0.50	0.50	1.571	1.571	2.93	2.93	2.17	2.17	17.5	16.6	16.6	
JAN 14 72	THU	99	3.143	4.2	1.2	0.50	0.50	1.351	1.351	2.93	2.93	3.02	3.02	16.0	15.1	15.1	
JAN 15 72	FRI	99	2.702	3.7	0.9	0.50	0.50	1.349	1.349	1.57	1.57	1.16	1.16	17.0	11.3	10.3	
JAN 16 72	SAT	99	1.942	3.1	0.8	0.50	0.50	1.400	1.400	1.57	1.57	1.12	1.12	17.0	11.5	10.5	43.4
JAN 17 72	SUN	15	2.698	3.8	0.7	0.50	0.50	1.432	1.432	1.57	1.57	1.10	1.10	17.0	11.6	10.6	
JAN 18 72	MON	15	2.801	4.0	0.8	0.50	0.50	1.483	1.483	1.57	1.57	1.06	1.06	18.0	11.8	10.8	49.1
JAN 19 72	TUE	15	2.864	4.0	0.8	0.50	0.50	1.482	1.482	1.57	1.57	1.30	1.30	17.5	11.8	10.8	
JAN 20 72	WED	15	2.967	4.1	0.7	0.50	0.50	1.304	1.304	1.57	1.57	1.30	1.30	17.5	11.1	10.1	41.3
JAN 21 72	THU	99	2.964	4.0	0.9	0.50	0.50	1.175	1.175	1.57	1.57	1.34	1.34	18.0	10.6	9.6	
JAN 22 72	FRI	99	2.608	3.8	0.8	0.50	0.50	1.494	1.494	1.57	1.57	1.30	1.30	18.0	11.9	10.8	
JAN 23 72	SAT	15	2.350	3.6	0.7	0.50	0.50										
JAN 24 72	SUN	99	2.948	4.1	0.8	0.50	0.50										
JAN 25 72	MON	15															

Date Obsv	Day of Week	Samp Type	Bod Load 2	Org C Load 1	Org C Load 2	Bod EPP 1	Bod EPP 2	SS EPP 1	SS EPP 2	Org C EPP 1	Org C EPP 2	Inf Bod 2	P-1 Bod 2	P-1 Bod 2	S-1 Bod 2	P-2 Bod 2	S-2 Bod 2
NOV 19 69	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 19 69	WED	6	38.8	26.1	26.1	80.7	81.3	85.0	80.1	69.8	66.7	187	72	38	36	74	38
NOV 20 69	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 20 69	THU	6	38.1	25.7	25.7	80.7	81.3	71.0	68.2	69.8	66.7	187	72	38	36	74	38
NOV 21 69	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 21 69	FRI	6	25.5	21.2	21.2	70.6	65.1	74.3	66.1	55.2	48.6	126	54	40	37	66	37
NOV 22 69	SAT	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 22 69	SAT	7	21.5	17.9	17.9	70.6	65.1	74.3	66.1	55.2	48.6	126	54	40	37	66	37
NOV 23 69	SUN	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 23 69	SUN	7	20.6	17.2	17.2	70.6	65.1	74.3	66.1	55.2	48.6	126	54	40	37	66	37
NOV 24 69	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 24 69	MON	6	34.0	25.2	25.2	78.4	77.8	69.4	68.9	71.7	65.4	171	71	36	37	71	31
NOV 25 69	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 25 69	TUE	6	32.6	24.2	24.2	78.4	77.8	92.5	93.2	71.7	65.4	171	71	36	37	71	31
NOV 26 69	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 27 69	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 28 69	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 28 69	FRI	6	14.6	11.8	11.8	76.2	81.0	75.0	81.7	56.9	63.7	126	42	22	30	47	19
NOV 29 69	SAT	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 29 69	SAT	7	17.3	18.0	18.0	76.2	81.0	77.8	78.3	56.9	63.7	126	42	22	30	47	19
NOV 30 69	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 1 69	MON	6	26.0	21.9	21.9	71.9	72.6	74.8	69.7	58.8	57.0	135	35	36	38	62	48
DEC 2 69	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 2 69	TUE	6	26.6	22.4	22.4	71.9	72.6	89.4	85.6	58.8	57.0	135	35	36	38	62	48
DEC 3 69	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 3 69	WED	6	26.7	20.2	20.2	77.0	74.8	78.4	78.4	62.7	52.9	135	64	25	31	40	38
DEC 4 69	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 4 69	THU	6	26.8	20.3	20.3	77.0	74.8	78.4	78.4	62.7	52.9	135	64	25	31	40	38
DEC 5 69	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 5 69	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 6 69	SAT	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 6 69	SAT	7	16.1	16.1	16.1	---	---	67.5	75.4	64.3	66.3	---	---	---	---	---	---
DEC 7 69	SUN	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 7 69	SUN	7	17.5	17.5	17.5	---	---	67.5	75.4	64.3	66.3	---	---	---	---	---	---
DEC 8 69	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 8 69	MON	6	40.2	21.0	21.0	75.5	73.6	79.4	54.1	51.3	58.3	220	69	41	54	87	58
DEC 9 69	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 9 69	TUE	6	43.9	22.9	22.9	75.5	73.6	79.0	79.0	51.3	58.3	220	69	41	54	87	58
DEC 10 69	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 10 69	WED	6	41.0	27.1	27.1	71.0	73.5	83.0	85.2	65.4	68.2	162	72	36	47	62	52
DEC 11 69	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 11 69	THU	6	35.6	23.5	23.5	71.0	73.5	93.5	93.5	65.4	68.2	162	72	36	47	62	52
DEC 12 69	FRI	7	28.5	22.5	22.5	75.4	79.7	87.5	81.0	60.6	69.7	138	61	26	34	72	34
DEC 13 69	SAT	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 13 69	SAT	7	25.0	19.7	19.7	75.4	79.7	87.5	81.0	60.6	69.7	138	61	26	34	72	34
DEC 14 69	SUN	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 14 69	SUN	7	26.0	20.5	20.5	75.4	79.7	81.0	83.2	60.6	69.7	138	61	26	34	72	34
DEC 15 69	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 15 69	MON	6	39.8	---	---	74.4	78.5	81.0	83.2	---	---	195	82	49	50	78	56
DEC 16 69	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 16 69	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 17 69	WED	6	38.0	---	---	74.4	78.5	81.1	89.6	---	---	195	82	49	50	78	56
DEC 17 69	WED	6	---	---	---	---	---	68.5	78.7	---	---	---	---	---	---	---	---
DEC 18 69	THU	6	---	---	---	---	---	78.1	76.3	---	---	---	---	---	---	---	---

Date of Obsv	Day of Week	Samp Type	Mod Load 2	Org C Load 1	Org C Load 2	Bod EFF 1	Bod EFF 2	SS EFF 1	SS EFF 2	Org C EFF 1	Org C EFF 2	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
DEC 18 69	THU	6														
DEC 19 69	THU	4														
DEC 20 69	FRI															
DEC 21 69	SAT															
DEC 22 69	SUN															
DEC 23 69	MON															
DEC 24 69	TUE															
DEC 25 69	WED															
DEC 26 69	THU															
DEC 27 69	FRI															
DEC 28 69	SAT															
DEC 29 69	SUN															
DEC 30 69	MON	6	30.4			77.7	77.3	88.1	87.4			220	93	49	90	53
DEC 31 69	TUE	6						42.9	44.9			220	93	49	90	53
JAN 1 70	WED	4	30.2			77.7	77.3									
JAN 2 70	THU															
JAN 3 70	FRI															
JAN 4 70	SAT															
JAN 5 70	SUN															
JAN 6 70	MON															
JAN 7 70	TUE															
JAN 8 70	WED															
JAN 9 70	THU															
JAN 10 70	FRI															
JAN 11 70	SAT															
JAN 12 70	SUN															
JAN 13 70	MON															
JAN 14 70	TUE															
JAN 15 70	WED															
JAN 16 70	THU															
JAN 17 70	FRI	4	33.3			80.3	76.0	84.8	80.8			183	84	36	72	46
JAN 18 70	SAT	4	32.9			80.3	76.0	84.8	80.8			183	84	36	72	46
JAN 19 70	SUN	4	38.0			81.4	76.5	84.1	84.1	68.1	66.0	183	65	46	82	56
JAN 20 70	MON	4	36.9			81.4	76.5	84.1	84.1	68.1	66.0	183	65	46	82	56
JAN 21 70	TUE	4	49.8			85.6	78.8	84.7	77.1	67.1	65.7	250	76	42	36	83
JAN 22 70	WED	4	50.1			85.6	78.8	84.7	77.1	67.1	65.7	250	76	42	36	83
JAN 23 70	THU	4	31.2			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 24 70	FRI	7	25.2			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 25 70	SAT	7	25.1			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 26 70	SUN	4	25.5			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 27 70	MON	4	24.1			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 28 70	TUE	4	25.6			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 29 70	WED	4	28.0			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 30 70	THU	4	20.7			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
JAN 31 70	FRI	7	18.4			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
FEB 1 70	SAT	7	18.7			79.4	74.5	71.2	71.2	69.8	66.9	165	67	34	46	65
FEB 2 70	SUN	4	36.6			87.1	68.9	86.5	75.7	74.4	62.8	132	56	29	72	37
FEB 3 70	MON	4	32.2			87.1	68.9	86.5	75.7	74.4	62.8	132	56	29	72	37
FEB 4 70	TUE	4	48.0			87.1	68.9	86.5	75.7	74.4	62.8	132	56	29	72	37
FEB 5 70	WED	4	59.9			87.1	68.9	86.5	75.7	74.4	62.8	132	56	29	72	37
FEB 6 70	THU	4	57.5			87.1	68.9	86.5	75.7	74.4	62.8	132	56	29	72	37
FEB 7 70	FRI	4	44.8			87.1	68.9	86.5	75.7	74.4	62.8	132	56	29	72	37
FEB 8 70	SAT	4	41.8			87.1	68.9	86.5	75.7	74.4	62.8	132	56	29	72	37

Date of Obsv	Day of Week	Samp Type	BoA Load 2	Org C Load 1	Org C Load 2	BoA Eff 1	SS Eff 1	SS Eff 2	SS Org C Eff 1	SS Org C Eff 2	Inf Bod	P-1 Bod	P-1 Mod	S-1 Mod	P-2 Bod	P-2 Mod	S-2 Mod
FEB 10 70	MON	4	77.8	16.8	38.1	73.3	72.8	77.6	69.4	64.3	195	81	49	57	79	43	53
FEB 11 70	TUE	4	56.2	16.3	33.2	73.3	72.8	77.6	69.4	64.3	195	81	49	52	79	43	53
FEB 12 70	WED	4	62.1	19.3	39.2	80.9	61.8	79.3	55.2	64.7	220	85	65	42	132	84	85
FEB 13 70	THU	4	62.0	19.3	39.2	80.9	61.8	79.3	55.2	64.7	220	85	65	42	132	84	85
FEB 14 70	FRI	7	51.7	15.8	32.0	86.5	77.6	81.5	64.3	67.2	192	83	28	26	71	36	43
FEB 15 70	SAT	7	45.5	13.9	28.2	86.5	77.6	81.5	64.3	67.2	192	83	28	26	71	36	43
FEB 16 70	SUN	7	20.5	6.2	12.7	86.5	77.6	81.5	64.3	67.2	192	83	28	26	71	36	43
FEB 17 70	MON	4	67.7	25.9	52.6	71.6	65.4	71.9	67.7	65.9	162	65	47	46	84	65	56
FEB 18 70	TUE	4	64.4	24.7	50.1	71.6	65.4	71.9	67.7	65.9	162	65	47	46	84	65	56
FEB 19 70	WED	4	55.7	21.1	42.9	70.5	61.5	80.6	66.1	60.8	156	72	56	46	114	67	60
FEB 20 70	THU	4	51.7	19.6	39.8	70.5	61.5	80.6	66.1	60.8	156	72	56	46	114	67	60
FEB 21 70	FRI	7	53.5	20.4	41.4	89.8	76.8	80.9	75.3	72.3	177	74	28	18	65	71	41
FEB 22 70	SAT	7	47.5	18.1	36.8	89.8	76.8	80.9	75.3	72.3	177	74	28	18	65	71	41
FEB 23 70	SUN	7	42.8	16.3	33.1	89.8	76.8	80.9	75.3	72.3	177	74	28	18	65	71	41
FEB 24 70	MON	4	52.0	21.5	43.7	86.7	77.2	77.0	66.0	66.2	180	78	25	24	68	43	41
FEB 25 70	TUE	4	51.8	21.3	43.1	86.7	77.2	77.0	66.0	66.2	180	78	25	24	68	43	41
FEB 26 70	WED	4	66.0	22.3	45.2	85.0	70.0	91.9	77.3	74.7	213	72	47	32	93	68	64
FEB 27 70	THU	4	65.7	22.2	45.0	85.0	70.0	91.9	77.3	74.7	213	72	47	32	93	68	64
FEB 28 70	FRI	7															
FEB 29 70	SAT	7															
MAR 1 70	SUN	7															
MAR 2 70	MON	4	78.2	25.5	51.9	77.0	69.3	80.0	68.7	63.3	270	111	67	62	126	111	83
MAR 3 70	TUE	4	77.9	25.4	51.6	77.0	69.3	80.0	68.7	63.3	270	111	67	62	126	111	83
MAR 4 70	WED	4	61.7	19.5	39.6	73.8	70.8	71.7	59.6	63.0	168	67	60	44	90	62	49
MAR 5 70	THU	7	65.2	20.7	41.9	73.8	70.8	71.7	59.6	63.0	168	67	60	44	90	62	49
MAR 6 70	FRI	7	48.1	18.8	38.2	78.7	66.7	82.1	80.5	89.3	181	66	35	30	89	26	47
MAR 7 70	SAT	7	39.4	15.4	33.3	78.7	66.7	82.1	80.5	89.3	181	66	35	30	89	26	47
MAR 8 70	SUN	7	38.7	15.1	30.7	78.7	66.7	82.1	80.5	89.3	181	66	35	30	89	26	47
MAR 9 70	MON	4	49.8	19.4	38.4	72.8	56.8	80.8	67.3	68.0	162	65	38	44	74	74	70
MAR 10 70	TUE	4	48.0	19.1	38.8	72.8	56.8	80.8	67.3	68.0	162	65	38	44	74	74	70
MAR 11 70	WED	4	43.6	13.2	26.7	71.8	52.1	81.8	75.0	52.2	187	59	41	42	78	67	66
MAR 12 70	THU	4	47.0	14.2	28.8	71.8	52.1	81.8	75.0	52.2	187	59	41	42	78	67	66
MAR 13 70	FRI	4	35.7	6.6	28.3	91.8	78.9	79.8	67.5	70.4	187	40	19	12	71	37	34
MAR 14 70	SAT	4	46.5	8.5	34.1	91.8	78.9	79.8	67.5	70.4	187	40	19	12	71	37	34
MAR 15 70	SUN	4															
MAR 16 70	MON	4	72.7	12.5	49.9	89.2	73.0	84.5	66.5	72.1	204	54	43	22	83	73	55
MAR 17 70	TUE	4	70.1	12.0	48.1	89.2	73.0	84.5	66.5	72.1	204	54	43	22	83	73	55
MAR 18 70	WED	4	28.5	11.2	44.8	82.7	18.7	66.4	44.9	61.0	75	61	34	13	17	77	61
MAR 19 70	THU	4	28.2	11.1	44.4	82.7	18.7	66.4	44.9	61.0	75	61	34	13	17	77	61
MAR 20 70	FRI	4															
MAR 21 70	SAT	4															
MAR 22 70	SUN	4															
MAR 23 70	MON	4		12.7	50.9			47.9	12.4	63.3	22.0						
MAR 24 70	TUE	4		11.3	45.1			47.9	12.4	63.3	22.0						
MAR 25 70	WED	4		8.6	34.3				55.5	62.6	29.7						
MAR 26 70	THU	4		7.2	28.8				55.5	62.6	29.7						
MAR 27 70	FRI	4															
MAR 28 70	SAT	4															
MAR 29 70	SUN	4															
MAR 30 70	MON	4	37.1	7.3	24.2	89.7	72.2	58.6	54.3	50.5	126	60	69	13	80	20	35
MAR 31 70	TUE	4	55.2	10.4	43.4	89.7	72.2	58.6	54.3	50.5	126	60	69	13	80	20	35
APR 1 70	WED	4															
APR 2 70	THU	4															

Date of Obsv	Day of Week	Sheep Type	Bod Load	Org C Load	Org C Load	Bod EFP	Bod EFP	SS EFP	SS EFP	Org C EFP	Org C EFP	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
APR 3 70	FRI	7	56.3	11.9	87.5	65.2	74.2	74.0	102.0	53.5	43.8	313	58	17	73	55
APR 4 70	SAT	7	78.5	9.7	38.7	89.2	78.2	74.0	46.0	63.5	43.8	213	58	23	76	52
APR 5 70	SUN	7	70.7	8.7	38.9	89.2	78.2	74.0	46.0	63.5	43.8	213	58	23	76	52
APR 6 70	MON	4	65.7	10.3	41.1	88.8	59.1	80.7	62.8	60.7	42.1	171	70	23	83	55
APR 7 70	TUE	4	63.7	10.0	39.8	88.8	59.1	80.7	62.8	60.7	42.1	171	70	23	83	55
APR 8 70	WED	4	60.4	10.2	41.0	88.9	61.9	77.9	62.8	60.7	42.1	171	70	23	83	55
APR 9 70	THU	4	60.1	10.2	40.8	88.9	61.9	77.9	62.8	60.7	42.1	171	70	23	83	55
APR 10 70	FRI	7	61.4			88.9	61.9	77.9	62.8	60.7	42.1	171	70	23	83	55
APR 11 70	SAT	7	53.8			85.8	71.6					183	65	26	92	80
APR 12 70	SUN	7	50.3			85.8	71.6					183	65	26	92	80
APR 13 70	MON															
APR 14 70	TUE															
APR 15 70	WED	4	40.1		50.5		0.0		40.9		40.2	89			86	89
APR 16 70	THU	4	37.4	0.0	47.1		0.0		40.9		40.2	89			86	89
APR 17 70	FRI	7	66.2		33.3		72.3		37.7		22.5	177			61	68
APR 18 70	SAT	7	58.4		29.4		72.3		37.7		22.5	177			61	68
APR 19 70	SUN	7	55.6		28.0		72.3		37.7		22.5	177			61	68
APR 20 70	MON															
APR 21 70	TUE															
APR 22 70	WED															
APR 23 70	THU															
APR 24 70	FRI	7	53.0	0.0	52.2		46.9		64.3		56.3	130			108	105
APR 25 70	SAT	7	45.9		45.2		46.9		64.3		56.3	130			108	105
APR 26 70	SUN	7	43.2		42.5		46.9		64.3		56.3	130			108	105
APR 27 70	MON	4														
APR 28 70	TUE	4														
APR 29 70	WED	4														
APR 30 70	THU	4														
MAY 1 70	FRI	7	67.5	45.8			63.0		73.1		53.6	162			108	78
MAY 2 70	SAT	7	61.0	41.4			63.0		73.1		53.6	162			108	78
MAY 3 70	SUN	7	62.1	42.1			63.0		73.1		53.6	162			108	78
MAY 4 70	MON															
MAY 5 70	TUE															
MAY 6 70	WED	4	83.2	32.4			68.4		92.5		10.8	190			102	60
MAY 7 70	THU	4	82.8	32.3			68.4		92.5		10.8	190			102	60
MAY 8 70	FRI															
MAY 9 70	SAT															
MAY 10 70	SUN	6	54.7	31.5			61.2		57.5		46.9	170			90	159
MAY 11 70	MON															
MAY 12 70	TUE	6	75.3	49.0			53.3		70.6		46.2	180			96	156
MAY 13 70	WED															
MAY 14 70	THU															
MAY 15 70	FRI															
MAY 16 70	SAT															
MAY 17 70	SUN	6	12.1	10.9	58.3		72.2		92.9		50.8	52.3	72	30	52	42
MAY 18 70	MON															
MAY 19 70	TUE															
MAY 20 70	WED	6	22.0	19.1	23.7		57.9		46.3		59.6	114	62	96	141	48
MAY 21 70	THU	6	33.8	22.4	65.5		64.4		67.9		68.7	174	102	52	102	246
MAY 22 70	FRI															
MAY 23 70	SAT															
MAY 24 70	SUN	6	10.7	13.7	97.2		80.6		88.5		70.7	47.8	72	2	54	14
MAY 25 70	MON															

Date of Obsv	Day of week	Seap Type	Boat Load	Org C Load	Org C Load	Boat EPP	Boat EPP	SS EPP	SS EPP	Org C EPP	Org C EPP	Inf	P-1	F-1	S-1	P-2	F-2	S-2
			2	1	2	1	2	1	2	1	2	Boat	Boat	Boat	Boat	Boat	Boat	Boat
MAY 26 70	TUE	-6	---	16.1	16.1	---	---	70.7	62.1	59.8	58.0	---	---	---	---	---	---	---
MAY 27 70	WED	6		21.9	21.9			45.2	40.4	71.8	72.5							
MAY 28 70	THU	6																
MAY 29 70	FRI	6																
MAY 30 70	SAT	6	7.0	18.2	18.2	90.7	63.0	78.8	81.7	72.5	65.1	58	18	9	5	21	18	20
MAY 31 70	SUN	6																
JUN 1 70	MON	6	18.5	17.5	17.5	85.0	92.5	79.5	84.1	74.3	69.9	120	15	14	18	33	26	9
JUN 2 70	TUE	6																
JUN 3 70	WED	6	21.4	20.1	20.1	88.7	88.0	87.1	91.3	73.6	68.3	150	30	17	17	42	28	24
JUN 4 70	THU	6																
JUN 5 70	FRI	6																
JUN 6 70	SAT	6	6.3	11.4	11.4	87.5	83.3	79.9	90.6	63.2	59.8	48	12	8	6	21	15	8
JUN 7 70	SUN	6																
JUN 8 70	MON	6	6.1	13.3	13.3	86.1	72.2	87.3	81.9	50.0	48.7	36	11	3	5	18	12	10
JUN 9 70	TUE	9		20.3	20.3			86.6	83.6	59.6	57.9							
JUN 10 70	WED	9	17.7	24.7	24.7	89.2	80.4	95.3	89.5	80.3	72.5	102	20	14	11	47		20
JUN 11 70	THU	6																
JUN 12 70	FRI	6																
JUN 13 70	SAT	6	8.6	17.3	17.3	86.4	86.4	88.1	82.5	75.8	67.4	66	17	14	9	23	17	9
JUN 14 70	SUN	6																
JUN 15 70	MON	6	23.5	22.0	22.0	85.9	74.8	75.2	65.5	66.7	53.5	135	32	27	19	50	31	34
JUN 16 70	TUE	6		23.2	23.0			90.3	83.3	72.0	69.7							
JUN 17 70	WED	6	24.6	17.7	17.7	89.6	85.4	83.8	74.0	67.3	53.8	144	39	35	15	54	29	21
JUN 18 70	THU	6																
JUN 19 70	FRI	6																
JUN 20 70	SAT	6	22.2	13.8	13.8	83.9	83.9	87.9	87.1	62.9	58.1	168	42	39	27	66	53	27
JUN 21 70	SUN	6		18.0	18.0			73.9	76.5	62.5	51.9							
JUN 22 70	MON	6	22.5	20.7	20.7	82.6	87.1	85.7	82.1	67.8	59.5	132	38	27	23	45	29	17
JUN 23 70	TUE	6		22.6	22.6			84.1	78.3	70.9	64.9							
JUN 24 70	WED	6	30.3	37.7	37.7	92.4	87.5	91.5	72.2	79.3	72.1	144	30	17	11	68	53	18
JUN 25 70	THU	6																
JUN 26 70	FRI	6																
JUN 27 70	SAT	6	15.8	12.9	12.9	69.1	68.3	73.9	68.3	57.0	52.0	123	45	21	38	56	45	39
JUN 28 70	SUN	6																
JUN 29 70	MON	6	25.4	18.0	18.0	84.7	87.3	88.3	81.6	66.3	60.6	150	31	23	23	66	29	19
JUN 30 70	TUE	6		23.5	23.5			88.5	83.2	75.4	67.2							
JUL 1 70	WED	6	19.6	21.0	21.0	70.9	70.9		73.0		69.6	117	36	57		54	32	34
JUL 2 70	THU	6																
JUL 3 70	FRI	6																
JUL 4 70	SAT	6	15.1	14.0	14.0	85.5	91.5	93.0	89.8	72.5	73.4	117	28	16	17	44	19	10
JUL 5 70	SUN	6																
JUL 6 70	MON	6																
JUL 7 70	TUE	6	25.2	22.0	22.0	82.7	78.7	38.5	79.9	74.8	65.6	150	31	28	26	61	30	32
JUL 8 70	WED	6		17.0	17.0			89.7	74.3	70.6	58.8							
JUL 9 70	THU	6																
JUL 10 70	FRI	6																
JUL 11 70	SAT	6	20.9	16.0	16.0	89.3	81.3	91.7	86.4	75.7	70.4	150	32	29	16	47	71	28
JUL 12 70	SUN	6		17.1	17.1			92.9	84.5	74.7	64.6							
JUL 13 70	MON	6																
JUL 14 70	TUE	6																
JUL 15 70	WED	6																
JUL 16 70	THU	6																
JUL 17 70	FRI	6																

Date of Obsv	Day of Week	Samp Type	Mod Load	Org C Load	Org C Load	Bod Eff	Bod Eff	SS Eff	SS Eff	Org C Eff	Org C Eff	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
JUL 18 70	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 19 70	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 20 70	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 21 70	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 22 70	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 23 70	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 24 70	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 25 70	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 26 70	SUN	6	8.3	16.5	8.1	72.6	79.9	85.6	77.8	68.7	69.8	---	---	---	---	---
JUL 27 70	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 28 70	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 29 70	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 30 70	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
JUL 31 70	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 1 70	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 2 70	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 3 70	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 4 70	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 5 70	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 6 70	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 7 70	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 8 70	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 9 70	SUN	6	31.6	28.3	12.0	94.1	86.3	89.2	87.6	60.3	67.2	306	23	18	30	82
AUG 10 70	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 11 70	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 12 70	WED	6	15.1	25.1	12.4	81.2	87.0	91.7	93.3	61.5	65.1	138	49	32	26	82
AUG 13 70	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 14 70	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 15 70	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 16 70	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 17 70	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 18 70	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 19 70	WED	11	28.3	32.6	16.1	89.2	88.3	90.9	85.8	79.2	75.5	240	59	32	26	82
AUG 20 70	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 21 70	FRI	6	21.6	26.8	13.2	86.7	89.4	90.1	93.1	65.2	71.3	188	51	36	25	39
AUG 22 70	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 23 70	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 24 70	MON	6	20.1	9.9	---	---	---	---	---	---	---	---	---	---	---	---
AUG 25 70	TUE	6	10.0	19.5	9.6	89.6	93.8	91.7	91.7	70.7	70.7	96	30	32	10	36
AUG 26 70	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 27 70	THU	6	11.2	19.3	9.5	69.3	90.4	80.2	90.5	62.9	73.2	114	47	20	35	30
AUG 28 70	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 29 70	SAT	6	15.5	12.0	5.9	80.2	80.2	88.1	91.7	53.4	58.9	192	54	34	18	36
AUG 30 70	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AUG 31 70	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEP 1 70	TUE	6	20.1	15.1	15.1	75.8	83.3	94.9	96.7	63.3	68.9	132	42	20	32	51
SEP 2 70	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEP 3 70	THU	6	26.9	14.4	14.4	84.2	83.1	90.6	84.3	61.1	61.1	177	62	28	74	26
SEP 4 70	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEP 5 70	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEP 6 70	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEP 7 70	MON	6	20.0	14.3	14.3	83.3	83.3	93.9	90.1	68.1	60.6	132	54	30	22	60
SEP 8 70	TUE	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEP 9 70	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEP 10 70	THU	6	22.8	20.2	20.2	79.9	80.6	92.7	92.2	71.9	74.2	144	99	35	29	65
SEP 10 70	THU	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Date of Obsv	Day of Week	Samp Type	Bod Load 2	Org C Load 1	Org C Load 2	Bod EFF 1	Bod EFF 2	SS EFF 1	SS EFF 2	Org C EFF 1	Org C EFF 2	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
SEP 11 70	FRI															
SEP 12 70	SAT															
SEP 13 70	SUN	6	18.5	15.7	15.7	49.5	55.9	81.3	89.6	68.9	63.8	111	55	23	56	43
SEP 14 70	MON	12														
SEP 15 70	TUE	6	27.4	20.9	20.9	85.2		86.4	77.3	62.5	51.1	135	61	20	69	32
SEP 16 70	WED	6														
SEP 17 70	THU	12														
SEP 18 70	FRI	6	38.7	33.0	33.0	84.2	80.8	91.7	89.9	68.1	62.6	177	73	29	75	42
SEP 19 70	SAT															
SEP 20 70	SUN	6	20.5	21.0	21.0	82.9	76.6	89.3	86.4	71.1	61.4	111	60	74	68	26
SEP 21 70	MON	12														
SEP 22 70	TUE	6	31.9	23.1	23.1	87.2	80.1	94.3	88.5	72.1	60.6	141	56	20	59	41
SEP 23 70	WED	12														
SEP 24 70	THU	6	27.2	23.9	23.9	86.2	75.6	92.1	89.3	76.0	70.4	123	63	26	17	80
SEP 25 70	FRI	12														
SEP 26 70	SAT	6	26.1	19.1	19.1	85.8	69.5	90.4	88.8	66.0	58.3	141	59	56	20	43
SEP 27 70	SUN	12														
SEP 28 70	MON	6	30.9	25.8	25.8	82.6	71.5	85.6	82.0	39.8	56.8	144	71	36	25	46
SEP 29 70	TUE	12														
SEP 30 70	WED	6														
OCT 1 70	THU	12														
OCT 2 70	FRI	6	40.2	16.6	33.8	77.5	71.0	88.0	83.1	63.8	56.0	138	79	35	31	40
OCT 3 70	SAT															
OCT 4 70	SUN	8														
OCT 5 70	MON	13	30.0	9.8	20.0	85.3	78.7	92.5	87.4	67.0	57.0	150	37	46	22	44
OCT 6 70	TUE	6														
OCT 7 70	WED	4	38.1	0.0	40.6	26.7		88.7	84.0	36.7	21.9	90			92	81
OCT 8 70	THU															
OCT 9 70	FRI															
OCT 10 70	SAT															
OCT 11 70	SUN															
OCT 12 70	MON															
OCT 13 70	TUE															
OCT 14 70	WED															
OCT 15 70	THU															
OCT 16 70	FRI															
OCT 17 70	SAT	6	25.9	11.7	23.8	80.8	50.8	87.3	67.1	66.4	42.7	120	32	58	23	59
OCT 18 70	SUN	12														
OCT 19 70	MON	6														
OCT 20 70	TUE	12														
OCT 21 70	WED	6	37.2			76.7	68.2	67.4	70.3			129	46	29	30	47
OCT 22 70	THU															

Date of Obsv	Day of Week	Samp Type	Bod Load	Org C Load	Bod EFF	SS EFF	SS EFF	Org C EFF	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
OCT 21 70	WED	6	---	---	---	---	---	---	---	---	---	---	---
OCT 22 70	THU	6	38.4	13.6	81.1	86.3	81.1	57.9	132	44	24	68	53
OCT 23 70	FRI	12	---	---	---	---	---	---	---	---	---	---	---
OCT 24 70	SAT	---	---	---	---	---	---	---	---	---	---	---	---
OCT 25 70	SUN	13	29.5	12.6	86.5	89.4	79.8	47.7	126	43	28	67	53
OCT 26 70	MON	12	---	---	---	---	---	---	---	---	---	---	---
OCT 27 70	TUE	6	42.8	17.8	84.7	90.3	77.0	66.7	150	40	26	70	36
OCT 28 70	WED	12	---	---	---	---	---	---	---	---	---	---	---
OCT 29 70	THU	6	52.4	18.0	86.6	92.8	76.3	67.3	186	83	99	85	101
OCT 30 70	FRI	12	---	---	---	---	---	---	---	---	---	---	---
OCT 31 70	SAT	6	37.6	15.4	85.5	90.1	80.3	72.2	117	26	23	46	40
NOV 1 70	SUN	10	---	---	---	---	---	---	---	---	---	---	---
NOV 2 70	MON	6	---	---	---	---	---	---	---	---	---	---	---
NOV 3 70	TUE	---	---	---	---	---	---	---	---	---	---	---	---
NOV 4 70	WED	6	82.4	19.9	79.7	90.3	63.4	65.8	153	74	47	72	59
NOV 5 70	THU	10	---	---	---	---	---	---	---	---	---	---	---
NOV 6 70	FRI	---	---	---	---	---	---	---	---	---	---	---	---
NOV 7 70	SAT	6	39.5	16.0	77.0	91.5	85.3	65.4	165	83	54	61	46
NOV 8 70	SUN	10	---	---	---	---	---	---	---	---	---	---	---
NOV 9 70	MON	6	---	---	---	---	---	---	---	---	---	---	---
NOV 10 70	TUE	6	43.4	11.9	81.4	87.7	78.3	54.5	129	36	16	64	40
NOV 11 70	WED	10	---	---	---	---	---	---	---	---	---	---	---
NOV 12 70	THU	6	---	---	---	---	---	---	---	---	---	---	---
NOV 13 70	FRI	---	---	---	---	---	---	---	---	---	---	---	---
NOV 14 70	SAT	---	---	---	---	---	---	---	---	---	---	---	---
NOV 15 70	SUN	---	---	---	---	---	---	---	---	---	---	---	---
NOV 16 70	MON	---	---	---	---	---	---	---	---	---	---	---	---
NOV 17 70	TUE	---	---	---	---	---	---	---	---	---	---	---	---
NOV 18 70	WED	---	---	---	---	---	---	---	---	---	---	---	---
NOV 19 70	THU	---	---	---	---	---	---	---	---	---	---	---	---
NOV 20 70	FRI	---	---	---	---	---	---	---	---	---	---	---	---
NOV 21 70	SAT	---	---	---	---	---	---	---	---	---	---	---	---
NOV 22 70	SUN	---	---	---	---	---	---	---	---	---	---	---	---
NOV 23 70	MON	---	---	---	---	---	---	---	---	---	---	---	---
NOV 24 70	TUE	6	16.2	33.0	---	78.6	66.2	66.1	46.5	---	---	---	---
NOV 25 70	THU	---	---	---	---	---	---	---	---	---	---	---	---
NOV 26 70	FRI	---	---	---	---	---	---	---	---	---	---	---	---
NOV 27 70	SAT	---	---	---	---	---	---	---	---	---	---	---	---
NOV 28 70	SUN	6	28.6	12.1	85.0	91.1	73.2	69.5	153	30	31	66	40
NOV 29 70	MON	6	18.2	37.0	---	83.7	76.7	64.3	---	---	---	---	---
NOV 30 70	TUE	6	42.1	17.9	86.4	90.0	73.5	72.4	147	36	28	85	42
DEC 1 70	WED	12	---	---	---	---	---	---	---	---	---	---	---
DEC 2 70	THU	6	18.6	37.8	---	84.1	70.7	63.9	---	---	---	---	---
DEC 3 70	FRI	6	38.7	16.7	80.3	84.9	50.7	60.3	132	28	31	61	58

Date of Obsv	Day of Week	Samp type	Bod Load 2	Org C Load 1	Org C Load 2	Bod EFF 1	Bod EFF 2	SS EFF 1	SS EFF 2	Org C EFF 1	Org C EFF 2	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
DEC 3 70	THU	12														
DEC 4 70	FRI	99														
DEC 5 70	SAT	99														
DEC 6 70	SUN	6	43.7	7.8	31.1	88.2	69.3	90.6	73.2	76.1	57.8	153	30	26	18	47
DEC 7 70	SUN	12														
DEC 8 70	MON	99														
DEC 9 70	TUE	6	56.2	11.2	45.0	83.0	45.5	79.2	50.0	70.5	34.8	165	43	34	28	90
DEC 10 70	TUE	12														
DEC 11 70	WED	6	59.6	11.7	47.0			57.2			81.0					
DEC 12 70	THU	12		13.1	52.4		50.0	56.5			52.3	174	56	31		87
DEC 13 70	FRI	99														
DEC 14 70	SAT	99														
DEC 15 70	SUN	6	37.7	8.0	31.8	85.2	51.1	77.8	71.4	64.9	40.4	135	29	19	20	65
DEC 16 70	MON	6	52.2	12.3	49.1	92.8	55.6	94.0	67.1	79.0	47.6	153	26	13	11	58
DEC 17 70	TUE	11		10.6	42.3			91.7	56.6	79.8	46.0				104	
DEC 18 70	WED	6		24.9	99.7			92.0	52.2	78.8	46.6					
DEC 19 70	THU	6		11.3	45.3			97.6	62.1	70.6	29.4					
DEC 20 70	FRI	6		5.9	23.7			97.9	69.0	79.4	86.0					
DEC 21 70	SAT	99		7.5	29.9											
DEC 22 70	SUN	99														
DEC 23 70	MON	99														
DEC 24 70	TUE	99														
DEC 25 70	WED	99														
DEC 26 70	THU	99														
DEC 27 70	FRI	99														
DEC 28 70	SAT	99														
DEC 29 70	SUN	6		4.5	17.9			94.7	74.8	76.1	63.0					
DEC 30 70	MON	6	32.4	8.5	34.1			95.5	82.9	82.2	60.2	181	23	13	12	36
DEC 31 70	TUE	6		7.6	30.5	91.5	78.5	81.1	76.8	81.2	53.7					
JAN 1 71	WED	99		6.7	26.3			87.7	76.7	75.2						
JAN 2 71	THU	99														
JAN 3 71	FRI	99														
JAN 4 71	SAT	99														
JAN 5 71	SUN	6	33.1	6.7	26.6	95.9	68.3	93.5	76.8	78.8	54.5	123	19	6	5	39
JAN 6 71	MON	6		11.3	45.0			89.5	68.1	80.0	57.5					
JAN 7 71	TUE	6	24.1	7.2	28.6	89.9	65.2	89.3	62.6	75.6	51.7	69	13	44	7	24
JAN 8 71	WED	6		6.4	25.5			91.1	40.0	78.8	42.3					
JAN 9 71	THU	6	27.5	5.7	22.7	92.2	38.2	86.2	57.7	72.6	28.6	102	24	16	8	63
JAN 10 71	FRI	99														
JAN 11 71	SAT	99														
JAN 12 71	SUN	6	34.5	8.2	32.9	84.8	70.5	91.5	52.7	65.0	22.0	105	24	18	16	31
JAN 13 71	MON	6		7.4	29.7			85.8	31.7	68.8	32.5					
JAN 14 71	TUE	6	41.2	10.1	40.4	79.0	54.3	82.9	64.6	62.1	46.6	105	32	25	22	48
JAN 15 71	WED	6		8.4	33.7			91.4	65.0	70.0	36.7					
JAN 16 71	THU	6	54.6	13.0	52.0	89.1	47.6	90.6	42.5	77.9	83.6	147	41	17	16	77
JAN 17 71	FRI	99														
JAN 18 71	SAT	99														
JAN 19 71	SUN	6	43.7	9.4	37.6	86.1	47.9	88.8	66.0	81.5	50.8	144	44	22	20	75
JAN 20 71	MON	6		41.8	20.4			55.6	81.9	60.1						
JAN 21 71	TUE	6	41.5	18.0	38.6	74.3	52.1	75.3	52.4	70.1	48.5	144	72	38	37	69
JAN 22 71	WED	6		14.1	28.6			81.3	62.4	62.4	37.6					
JAN 23 71	THU	6	52.8	17.9	36.3	78.5	61.8	89.5	56.5	65.6	39.1	186	92	41	40	71
JAN 24 71	FRI	99														
JAN 25 71	SAT	99														

Date of Obsv	Day of Week	Shap Type	Bod Load	Org C Load	Org C Load	Bod EPP	Bod EPP	SS EPP	SS EPP	Org C EPP	Org C EPP	Inf Bod	P-1 Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
JAN 24 71	SUN	6	41.9	16.1	32.8	85.5	70.9	93.9	78.3	71.5	55.3	165	67	37	24	100	48
JAN 25 71	MON	6		20.0	40.5			81.6	60.9	72.6	59.3						
JAN 26 71	TUE	6	31.0	14.3	29.0	82.0	52.3	85.0	56.3	73.1	48.1	111	54	28	20	90	53
JAN 27 71	WED	6		13.1	26.6			87.9	56.1	66.3	53.8						
JAN 28 71	THU	6	31.4	14.9	30.2	82.2	61.2	89.2	66.9	70.2	53.2	129	72	28	23	102	50
JAN 29 71	FRI	99															
JAN 30 71	SAT	99															
JAN 31 71	SUN	99															
FEB 1 71	MON	6		20.0	40.5			84.4	53.1	70.1	54.6						
FEB 2 71	TUE	6	60.4	28.5	57.8	68.8	63.0	74.5	69.8	59.8	50.8	138	66	38	43	95	51
FEB 3 71	WED	6		12.9	26.2			72.8	57.6	46.3	49.6						
FEB 4 71	THU	6	29.2	13.3	26.9	64.0	58.8	78.2	52.3	56.2	47.6	114	68	73	41	74	47
FEB 5 71	FRI	99															
FEB 6 71	SAT	99															
FEB 7 71	SUN	6	35.6	13.3	27.1	67.5	73.0	83.1	73.1	61.5	58.3	126	86	71	41	75	34
FEB 8 71	MON	6		12.2	24.8			51.8	40.3	51.9							
FEB 9 71	TUE	6	24.1	14.0	28.4	56.0	59.5	61.8	36.6	45.5	55.6	84	56	36	37	71	45
FEB 10 71	WED	6		15.7	31.8			64.1	47.9	47.1							
FEB 11 71	THU	6	39.2	18.2	37.0	54.1	62.9	47.3	57.4	5.0	48.0	159	83	77	73	89	59
FEB 12 71	FRI	99															
FEB 13 71	SAT	99															
FEB 14 71	SUN	6	35.8	12.8	26.1	51.0	53.1	68.1	43.6	54.2	48.6	147	77	74	72	83	61
FEB 15 71	MON	6		15.0	30.5			48.9	46.6	43.2	46.6						
FEB 16 71	TUE	6	29.0	22.7	20.2	48.1	69.9	39.9	34.8	42.6	50.0	156	77	96	81	48	71
FEB 17 71	WED	6		20.5	20.5			25.5	10.2	49.1	43.0						
FEB 18 71	THU	6	25.2	26.9	26.9	44.4	59.0	59.2	47.9	51.9	57.8	144	93	86	80	92	80
FEB 19 71	FRI	99															
FEB 20 71	SAT	99															
FEB 21 71	SUN	6	19.0	21.6	21.6	48.6	50.7	41.0	39.9	51.0	54.8	138	102	93	71	93	72
FEB 22 71	MON	6		25.2	25.2			60.7	33.2	39.5	36.4						
FEB 23 71	TUE	6	20.0	20.2	20.2	43.0	61.4	55.8	66.9	33.9	42.6	114	77	102	65	80	63
FEB 24 71	WED	6		15.2	15.2			54.7	57.8	25.3	42.9						
FEB 25 71	THU	6	24.8	21.2	21.2	41.7	65.3	52.9	55.4	43.1	52.8	144	100	104	84	86	66
FEB 26 71	FRI	99															
FEB 27 71	SAT	99															
FEB 28 71	SUN	6	20.3	12.9	12.9	46.7	60.7	55.2	64.8	34.7	42.1	150	87	92	80	90	80
MAR 1 71	MON	6		18.2	18.2			70.4	73.1	47.5	58.3						
MAR 2 71	TUE	6	23.1	21.1	21.1	41.4	63.1	63.5	56.5	34.7	58.4	111	93	81	65	87	54
MAR 3 71	WED	6															
MAR 4 71	THU	6	20.6	19.5	19.5	51.1	70.0	63.1	72.5	55.3	64.7	90	71	54	44	80	39
MAR 5 71	FRI	99															
MAR 6 71	SAT	99															
MAR 7 71	SUN	6	17.4	16.8	16.8	51.9	51.9	43.2	59.2	24.4	48.7	81	68	51	39	68	32
MAR 8 71	MON	6		24.2	24.2			50.5	19.9	27.1	14.6						
MAR 9 71	TUE	6	28.9	25.5	25.5	54.7	28.2	71.7	59.0	49.5	45.6	117	66	65	53	72	60
MAR 10 71	WED	6															
MAR 11 71	THU	6	40.9	30.7	30.7	56.4	63.6	69.3	64.2	48.4	49.2	165	86	92	72	86	60
MAR 12 71	FRI	99															
MAR 13 71	SAT	99															
MAR 14 71	SUN	6	22.0	19.8	19.8	52.1	62.4	60.2	54.4	52.4	49.5	117	75	71	56	74	66
MAR 15 71	MON	6		28.8	28.8			63.8	55.8	43.0	48.8						
MAR 16 71	TUE	6	25.2	27.0	27.0	50.0	67.5	65.4	65.4	58.5	63.7	126	74	75	63	74	71
MAR 17 71	WED	6		34.3	34.3			72.8	75.1	47.2	52.0						

Date of Obsv	Day of Week	Samp Type	Bod Load	Org C Load	Org C Load	Bod EFP	Bod EFP	SS EFP	SS EFP	Org C EFP	Org C EFP	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	F-2 Bod	S-2 Bod
MAR 18 71	THU	6	38.3	22.4	22.4	54.3	66.7	---	---	25.3	45.3	162	79	74	71	69	54
MAR 19 71	FRI	99															
MAR 20 71	SAT	99															
MAR 21 71	SUN	6	33.2	25.6	25.6	66.7	72.5	63.8	58.3	50.8	52.3	171	89	94	87	78	47
MAR 22 71	MON	6		37.7	37.7			68.7	53.8	77.5	66.3						
MAR 23 71	TUE	6	41.5	32.5	32.5	85.6	63.9	50.0	40.8	34.8	34.0	180	93	86	98	69	65
MAR 24 71	WED	6															
MAR 25 71	THU	6	42.8			66.7	69.9	64.7	64.1			186	77	90	62	102	56
MAR 26 71	FRI	99															
MAR 27 71	SAT	99															
MAR 28 71	SUN	6		15.2	15.2			49.7	48.3	33.3	40.0						
MAR 29 71	MON	6		23.7	23.7			19.1	36.9	41.8	44.8						
MAR 30 71	TUE	6	20.6	20.6	20.6	59.4	40.6	55.8	39.7	40.6	22.9	96	45	56	39	56	57
MAR 31 71	WED	6		18.6	18.6			45.1	68.8	41.7	55.2						
APR 1 71	THU	6	22.2	17.6	17.6	45.8	33.3			23.2	17.9	120	48	54	65	59	80
APR 2 71	FRI	99															
APR 3 71	SAT	99															
APR 4 71	SUN	6		17.1	17.1			68.5	78.1	52.6	61.9		47	45	62	59	62
APR 5 71	MON	6		25.8	25.8			62.4	64.7	49.5	52.5						
APR 6 71	TUE	6	30.7	34.4	34.4	69.7	67.7	63.2	67.3	55.9	57.7	99	51	36	30	56	32
APR 7 71	WED	6		27.8	27.8			72.6	59.5	62.8	54.3						
APR 8 71	THU	6	32.4	31.3	31.3	75.0	55.0	44.7	64.6	52.6	44.8	120	44	38	30	75	54
APR 9 71	FRI	99															
APR 10 71	SAT	99															
APR 11 71	SUN	99															
APR 12 71	MON	6		26.8	26.8			69.0	56.0	50.0	39.8						
APR 13 71	TUE	6	37.1	37.8	37.8	74.5	47.7	67.6	53.6	59.0	53.8	153	63	48	39	89	80
APR 14 71	WED	6		30.6	30.6					58.0	48.9						
APR 15 71	THU	6	35.9	31.2	31.2	72.5	53.6	61.3	64.4	49.6	40.6	153	63	42	42	87	71
APR 16 71	FRI	99															
APR 17 71	SAT	99															
APR 18 71	SUN	6	29.4	27.0	27.0	78.4		79.1	64.6	60.4	49.7	162	62	47	35	84	75
APR 19 71	MON	6		32.4	32.4			85.2	80.1	68.7	55.8						
APR 20 71	TUE	6	29.0	28.1	28.1	74.4	37.2	72.7	63.9	60.0	53.6	129	47	42	33	72	47
APR 21 71	WED	6		28.8	28.8			90.2	75.1	65.3	58.9						
APR 22 71	THU	6	31.4	28.1	28.1	73.3	55.6			64.5	48.8	135	75	36	36	87	60
APR 23 71	FRI	99															
APR 24 71	SAT	99															
APR 25 71	SUN	6	25.5	24.3	24.3	74.1	47.6	89.7	87.6	70.7	60.0	147	56	42	38	74	77
APR 26 71	MON	6		21.2	21.2			67.1	57.6	50.5	40.2						
APR 27 71	TUE	6	32.9	33.8	33.8	62.5	69.4	75.8	75.1	67.8	62.6	144	95	66	54	72	44
APR 28 71	WED	6															
APR 29 71	THU	6	32.5	27.3	27.3	61.6	54.3	57.5	60.2	56.9	45.7	138	60	57	53	88	63
APR 30 71	FRI	99															
MAY 1 71	SAT	99															
MAY 2 71	SUN	6	23.7	19.8	19.8	55.3	39.4	56.1	68.8	31.8	61.8	132	62	165	59	81	80
MAY 3 71	MON	6		29.0	29.0			49.7	60.6	59.4	58.6						
MAY 4 71	TUE	6	34.3	30.5	30.5	75.6	57.7	59.5	65.2	56.1	63.3	156	80	153	38	75	66
MAY 5 71	WED	99															
MAY 6 71	THU	6	37.9	28.9	28.9	52.4	67.9	57.7	53.6	51.6	64.1	168	65	48	80	88	72
MAY 7 71	FRI	99															
MAY 8 71	SAT	99															
MAY 9 71	SUN	6	31.0	29.1	29.1	79.2	59.0	73.9	54.3	71.5	59.3	183	77	150	38	83	75

Date of Obs	Day of Week	Day of Samp Type	Boa Load	Org C Load	Org C Load	Boa EPP	Boa EPP	SS EPP	SS EPP	Org C EPP	Org C EPP	Inf Mod	P-1		S-1		P-2		S-2
													Boa	Mod	Boa	Mod	Boa	Mod	
MAY 10 71	MON	99																	
MAY 11 71	TUE	99																	
MAY 12 71	WED	99																	
MAY 13 71	THU	99																	
MAY 14 71	FRI	99																	
MAY 15 71	SAT	99																	
MAY 16 71	SUN	6	44.4	38.4	77.6	60.3	65.1	52.7	59.3	58.5	156	62	47	35	77	69	62		
MAY 17 71	MON	6		41.2			89.8	84.7	62.8	66.9									
MAY 18 71	TUE	6	21.1	52.9	50.0	42.9	86.5	87.6	64.9	67.3	84	70	35	42	52	82	48		
MAY 19 71	WED	99																	
MAY 20 71	THU	6	35.3	32.9	77.6	41.5	92.0	81.1	55.5	55.5	147	92	53	33	72	74	86		
MAY 21 71	FRI	99																	
MAY 22 71	SAT	99																	
MAY 23 71	SUN	6	43.4	29.6	45.8	66.3	88.6	86.2	64.9	65.5	246	112	48	35	130	75	83		
MAY 24 71	MON	6		38.7					59.8	59.2									
MAY 25 71	TUE	6		33.3			94.0	93.3	61.7	58.0									
MAY 26 71	WED	6		31.1			89.7	89.7	67.3	63.2									
MAY 27 71	THU	6	27.6	27.1	67.9	76.9	85.6	74.2	68.0	57.5	156	68	32	50	57	38	36		
MAY 28 71	FRI	99																	
MAY 29 71	SAT	99																	
MAY 30 71	SUN	99																	
MAY 31 71	MON	6		17.6			86.2	81.6	64.0	57.0									
JUN 1 71	TUE	6	23.0	32.4	95.1	88.6	93.4	92.8	76.3	69.9	123	29	17	6	39	32	14		
JUN 2 71	WED	6		34.5			88.7	90.9	68.8	66.1									
JUN 3 71	THU	6	23.6	31.6	91.7	91.7	91.0	68.7	72.9	69.5	132	41	20	11	3	0	11		
JUN 4 71	FRI	99																	
JUN 5 71	SAT	99																	
JUN 6 71	SUN	6		20.1			81.4	81.4	71.5	72.3									
JUN 7 71	MON	6		25.7					66.4	65.6									
JUN 8 71	TUE	6	35.9	20.1	61.3				59.6	54.8	186	70	53	72	66	69			
JUN 9 71	WED	6		24.1					65.1	67.5									
JUN 10 71	THU	6	29.5	26.9	78.8	85.3	83.5	87.1	68.3	61.3	156	60	50	33	57	38	23		
JUN 11 71	FRI	99																	
JUN 12 71	SAT	99																	
JUN 13 71	SUN	6	25.6		80.2	85.2	90.4	87.4			162	47	36	32	42	42	24		
JUN 14 71	MON	6																	
JUN 15 71	TUE	6	25.2		84.8	81.8	85.7	82.7			198	58	39	30	74	59	36		
JUN 16 71	WED	6					91.9	92.5											
JUN 17 71	THU	99																	
JUN 18 71	FRI	99																	
JUN 19 71	SAT	99																	
JUN 20 71	SUN	99																	
JUN 21 71	MON	99																	
JUN 22 71	TUE	6	20.1	16.8	68.8	62.5	75.3	80.6	45.0	69.2	144	77	57	45	50	26	54		
JUN 23 71	WED	99																	
JUN 24 71	THU	6	37.8	20.2	75.0	89.7			59.6	67.9	204	76	41	51	84	35	21		
JUN 25 71	FRI	99																	
JUN 26 71	SAT	6	16.9	17.6	75.0	55.6	87.8	90.9	67.9	71.4	108	47	41	27	27	47	48		
JUN 27 71	SUN	99																	
JUN 28 71	MON	6		13.9			88.9	90.9	65.5	74.1									
JUN 29 71	TUE	6	25.5	18.8	75.0	87.5			51.9	67.9	144	53	71	36	39	27	18		
JUN 30 71	WED	6		21.7			83.5	87.6	63.7	69.0									
JUL 1 71	THU	6	22.8	22.8					54.4	59.6									

Date of Obsv	Day of Week	Samp Type	Bod Load	Org C Load	Bod EFF	Bod EFF	SS PPF	SS PPF	Org C EFF	Org C EFF	Inf Bod	P-1 Bod	S-1 Bod	P-2 Bod	S-2 Bod
			2	1	2	1	2	1	2	1					
JUL 2 71	FRI	99													
JUL 3 71	SAT	99													
JUL 4 71	SUN	99													
JUL 5 71	MON	6													
JUL 6 71	TUE	6	22.5	19.4	86.8	86.3	90.9	71.4	75.6	114	63	26	15	21	9
JUL 7 71	WED	6		25.0		86.0	76.2	71.8	65.0						
JUL 8 71	THU	6	21.9	23.4	81.6	73.9	75.4	64.0	66.4	114	32	20	21	29	56
JUL 9 71	FRI	99													
JUL 10 71	SAT	99	20.4	17.4	82.6	87.3	92.1	68.1	69.9	132	63	29	23	35	62
JUL 11 71	SUN	99													
JUL 12 71	MON	6		12.0		92.1	90.4	48.5	50.0						
JUL 13 71	TUE	6		21.1		82.9	73.3	72.6	69.2						
JUL 14 71	WED	6		21.0		93.3	94.8	72.9	75.4						
JUL 15 71	THU	6	35.3	22.5	85.4	89.5	94.4	72.2	77.8	198	100	50	29	44	32
JUL 16 71	FRI	99													
JUL 17 71	SAT	99	25.2	18.3	82.1	89.9	90.6	69.7	77.0	168	81	51	30	38	45
JUL 18 71	SUN	99													
JUL 19 71	MON	6		25.6		94.0	94.0	79.7	81.8						
JUL 20 71	TUE	6	21.3	22.1	90.0	90.8	93.5	75.2	76.0	120	48	15	12	20	11
JUL 21 71	WED	6		20.3		94.7	94.7	80.7	77.2						
JUL 22 71	THU	6	27.2	19.4	94.1	92.6	92.0	74.3	75.2	153	92	18	9	50	8
JUL 23 71	FRI	99													
JUL 24 71	SAT	99	12.0	22.2	92.6	94.0	89.0	76.7	75.3	81	59	15	6	32	14
JUL 25 71	SUN	99													
JUL 26 71	MON	6		26.3		91.6	91.0	73.4	75.5						
JUL 27 71	TUE	6	20.0	24.6	73.7	77.2	83.7	66.4	77.9	114	63	74	30	39	32
JUL 28 71	WED	6		23.4		94.5	94.7	66.2	75.2						
JUL 29 71	THU	6	32.8	22.2	88.3			58.6	79.3	171	102	33	20	27	15
JUL 30 71	FRI	99													
JUL 31 71	SAT	99													
AUG 1 71	SUN	99		20.8		76.0	92.5	38.4	75.8						
AUG 2 71	MON	6		23.4		88.9	91.4	66.4	76.3	114	77	21	10	54	51
AUG 3 71	TUE	6	23.4	19.0	73.7	88.6	89.3	78.2	83.1						
AUG 4 71	WED	6	19.1	20.9	88.5	93.8	77.9	63.8	69.5	86	78	8	11	24	35
AUG 5 71	THU	6													
AUG 6 71	FRI	99													
AUG 7 71	SAT	99													
AUG 8 71	SUN	99													
AUG 9 71	MON	6		30.2		86.4	93.5	74.7	81.8						
AUG 10 71	TUE	6	21.3	24.5	86.4	87.8	92.4	93.5	75.7	147	55	13	20	30	27
AUG 11 71	WED	6		24.9		91.9	91.9	64.6	71.5						
AUG 12 71	THU	6	30.9	25.9	81.5	88.1	79.2	86.7	79.4	168	95	53	31	42	50
AUG 13 71	FRI	99													
AUG 14 71	SAT	6	15.0	15.6	88.5	76.0	74.3	70.6	70.0	96	62	30	11	20	32
AUG 15 71	SUN	99													
AUG 16 71	MON	6		22.9		91.3	89.6	79.4	77.1						
AUG 17 71	TUE	6	35.5	20.9	59.0	87.5	89.5	90.9	70.6	144	77	21	59	74	18
AUG 18 71	WED	6		20.6											
AUG 19 71	THU	6	27.3	20.1	75.0	86.8	84.9	90.4	75.5	144	74	71	36	72	32
AUG 20 71	FRI	99													
AUG 21 71	SAT	6		14.6		92.5		77.0							
AUG 22 71	SUN	99		28.1		89.8	79.6	80.5	73.8						
AUG 23 71	MON	6													

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Date of Obs	Day of Week	Stad Type	Boi Load	Org C Load	Org C Load	Boi Eff	Boi Eff	SS Eff	SS Eff	Org C Eff	Org C Eff	Inf	P-1	P-1	S-1	P-2	P-2	S-2
AUG 24 71	TUE	6	25.0	28.9	28.9	90.0	88.3	94.0	94.0	71.2	65.8	120	57	23	12	26	42	18
AUG 25 71	WED	6	7.1	7.1	7.1	85.0	85.0	85.0	85.0	77.9	76.2	153	89	15	23	81	57	17
AUG 26 71	THU	99	6	14.6	13.8	85.0	85.0	91.3	87.7	77.2	75.9	132	78	27	17	27	59	9
AUG 27 71	FRI	99	6	2.2	3.0	87.1	93.2	79.1	92.7	81.6	78.2	159	90	16	29	83	29	20
AUG 28 71	SAT	99	6	23.7	23.7	81.8	87.4	83.6	87.1	77.2	75.8	300	114	92	138	120	104	106
AUG 29 71	SUN	99	6	13.6	13.4	80.8	81.8	83.5	80.8	76.3	77.6							
AUG 30 71	MON	6	36.1	36.1	36.1	64.0	64.0	79.4	79.4	66.0	61.0							
SEP 1 71	TUE	6	40.4	37.8	37.8													
SEP 2 71	WED	6																
SEP 3 71	THU	6																
SEP 4 71	FRI	99																
SEP 5 71	SAT	99																
SEP 6 71	SUN	99																
SEP 7 71	MON	6	52.5	34.2	34.2	81.1	82.1	87.2	87.2	71.6	71.6	201	74	51	38	100	42	36
SEP 8 71	TUE	6	51.5	57.9	57.9	84.4	82.8					192	72	15	10	96	33	33
SEP 9 71	WED	6	40.1	41.5	41.5	81.3	63.2	82.2	82.2	71.2	70.5	144	56	53	27	83	92	53
SEP 10 71	THU	99	6	45.7	45.7			48.1	48.1	82.1	51.1	74.1						
SEP 11 71	FRI	99	6	43.7	43.7			60.7	60.7	72.6	64.1	68.0						
SEP 12 71	SAT	99	6	36.0	36.0			82.1	82.1	83.4	63.1	66.8	100			102	38	27
SEP 13 71	SUN	99	6	30.4	28.8	79.5	86.4	89.5	89.5	83.6	72.0	132	75	29	27	33	59	18
SEP 14 71	MON	6	54.0	54.3	54.3			84.1	84.1	81.9	76.9	76.8						
SEP 15 71	TUE	6	54.0	40.2	40.2	79.5	79.5	79.1	79.1	77.8	68.1	156	88	84	63	63	57	32
SEP 16 71	WED	6	55.3	30.8	30.8			84.8	84.8	75.9	72.4	183	54	42	27	128	54	54
SEP 17 71	THU	99	6	32.3	32.3	85.2	70.5	88.6	80.4	71.0	63.6							
SEP 18 71	FRI	99	6	29.7	29.7	85.9	83.3	88.8	77.6	74.8	70.4	234	63	27	33	74	39	39
SEP 19 71	SAT	99	6	32.9	32.9													
SEP 20 71	SUN	99	6	49.0	35.9	75.8	85.5	66.3	82.1	66.9	75.2	165	59	20	40	92	59	24
SEP 21 71	MON	6	51.5	28.6	28.6	89.9	88.1	78.5	71.0	72.9	69.4	159	44		16	50	16	19
SEP 22 71	TUE	99	6	38.7	38.7			66.4	80.0	74.8	81.9							
SEP 23 71	WED	6	55.1	46.1	46.1	82.4	60.4	81.5	82.1	75.9	76.7	159	77	47	28	126	84	63
SEP 24 71	THU	99	6	31.6	31.6			72.4	87.9	56.6	67.5							
SEP 25 71	FRI	99	6	26.6	26.6													
SEP 26 71	SAT	99	6	46.5	46.5													
SEP 27 71	SUN	99	6	55.1	32.0	56.3	75.9	71.3	69.7	74.1	56.9	72	32	18	73	50	80	18
SEP 28 71	MON	6	53.5	35.1	35.1	55.6	88.3	48.6	69.4	49.2	67.8	180	83	42	80	92	62	21
SEP 29 71	TUE	99	6															
SEP 30 71	WED	99	6															
OCT 1 71	THU	99	6															
OCT 2 71	FRI	99	6															
OCT 3 71	SAT	99	6															
OCT 4 71	SUN	99	6															
OCT 5 71	MON	6																
OCT 6 71	TUE	6																
OCT 7 71	WED	6																
OCT 8 71	THU	99	6															
OCT 9 71	FRI	99	6															
OCT 10 71	SAT	99	6															
OCT 11 71	SUN	99	6															
OCT 12 71	MON	6																
OCT 13 71	TUE	6																
OCT 14 71	WED	6																
OCT 15 71	THU	99	6															
OCT 16 71	FRI	99	6															

Date of Obsv	Day of Week	Samp type	Boil Load 2	Orq C Load 1	Orq C Load 2	Bod Eff 1	Bod Eff 2	SS Eff 1	SS Eff 2	Orq C Eff 1	Orq C Eff 2	Inf Bod	P-1 Bod	P-1 Rod	S-1 Rod	P-2 Bod	P-2 Rod	S-2 Bod
OCT 16 71	SAT	6	21.9	26.3	26.3	4.3	45.2	86.3	81.4	69.6	71.4	93	48	45	89	77	56	51
OCT 17 71	SUN	99																
OCT 18 71	MON	6		39.7	39.7			67.2	77.6	61.5	67.8							
OCT 19 71	TUE	6		38.9	38.9			68.3	74.2	65.7	70.1							
OCT 20 71	WED	6		38.8	38.8			60.4	75.0	64.7	72.1							
OCT 21 71	THU	6	46.4	39.9	39.9	81.4	86.4	76.1	84.3	69.1	75.0	177	56	29	33	69	65	24
OCT 22 71	FRI	99																
OCT 23 71	SAT	6	39.4	20.7	20.7	71.4	88.6	79.6	73.5	21.8	50.9	105	32	30	30	53	12	12
OCT 24 71	SUN	99																
OCT 25 71	MON	99																
OCT 26 71	TUE	99																
OCT 27 71	WED	99																
OCT 28 71	THU	99																
OCT 29 71	FRI	99																
OCT 30 71	SAT	99																
OCT 31 71	SUN	99																
NOV 1 71	MON	6		43.4	43.4			83.5	75.0	61.0	61.6							
NOV 2 71	TUE	6	45.2	42.0	42.0	73.2	72.5	78.0	78.0	61.3	56.3	153	72	69	41	72	45	42
NOV 3 71	WED	6		58.4	58.4					64.5	64.5							
NOV 4 71	THU	99																
NOV 5 71	FRI	99																
NOV 6 71	SAT	99																
NOV 7 71	SUN	99																
NOV 8 71	MON	99																
NOV 9 71	TUE	99																
NOV 10 71	WED	6																
NOV 11 71	THU	6	44.9	39.2	39.2	70.9	65.5	69.6	60.2	54.2	61.1	165	72	53	48	90	42	57
NOV 12 71	FRI	99																
NOV 13 71	SAT	6	40.3	34.4	34.4	66.7	85.5	80.2	83.1	72.3	68.6	186	96	53	62	83	39	27
NOV 14 71	SUN	99																
NOV 15 71	MON	6		50.6	50.6			84.0	68.9	61.3	58.1							
NOV 16 71	TUE	6	47.0	49.3	49.3	65.0	76.3	85.0	82.1	64.0	68.3	177	56	47	62	81	47	42
NOV 17 71	WED	6		57.6	57.6			79.4	77.4	71.0	74.7							
NOV 18 71	THU	6	44.0	38.7	38.7	76.4	76.4	82.8	90.2	63.4	62.1	165	62	54	39	64	44	39
NOV 19 71	FRI	99																
NOV 20 71	SAT	6		29.8	29.8			85.1	72.3	76.7	70.5							
NOV 21 71	SUN	99																
NOV 22 71	MON	6		36.3	36.3			81.6	83.7	64.3	69.3							
NOV 23 71	TUE	6		30.2	30.2				71.5									
NOV 24 71	WED	99																
NOV 25 71	THU	99																
NOV 26 71	FRI	99																
NOV 27 71	SAT	6	39.2	14.6	14.6	67.8	81.6		75.6		60.0	174	66	54	56	75	36	32
NOV 28 71	SUN	99																
NOV 29 71	MON	6		42.8	42.8			84.2	77.4	74.0	68.7							
NOV 30 71	TUE	15		40.1	40.1			83.6	72.7	74.5	72.9							
DEC 1 71	WED	15		38.0	38.0													
DEC 2 71	THU	15	46.3	36.7	36.7	76.7	78.9	75.7	69.6	70.8	70.8	180	81	32	42	86	48	38
DEC 3 71	FRI	99																
DEC 4 71	SAT	15	45.7	36.9	36.9	71.8	73.4	80.2	84.7	73.4	67.1	177	71	59	50	81	47	47
DEC 5 71	SUN	99																
DEC 6 71	MON	15		49.0	49.0			86.5	71.8	77.5	71.3							
DEC 7 71	TUE	15	44.4	38.9	38.9	77.1	70.6	86.4	77.7	73.1	70.9	153	74	60	35	87	75	45

Date of Obsv	Day of Week	Sand type	Bod Load 2	Org C Load 1	Org C Load 2	Bod EPP 1	Bod EPP 2	SS EPP 1	SS EPP 2	Org C EPP 1	Org C EPP 2	Inf Bod	P-1 Bod	P-1 Rod	S-1 Bod	P-2 Bod	S-2 Bod
DEC 8 71	WED	15	--	45.1	49.1	--	--	78.4	79.7	77.0	75.9	--	--	--	--	--	--
DEC 9 71	THU	15	51.3	39.9	39.9	79.3	69.7	82.6	74.9	72.7	66.2	198	89	87	41	99	86
DEC 10 71	FRI	99															
DEC 11 71	SAT	15	41.1	30.7	30.7	65.1		80.1		62.3		195	87	80	68	81	74
DEC 12 71	SUN	99															
DEC 13 71	MON	15		49.9	49.9			70.8	76.8	68.2	75.3						
DEC 14 71	TUE	15		38.9	38.9			76.3	72.6	66.2	57.0						
DEC 15 71	WED	15	50.5	38.0	38.0	71.4	67.6	71.7	71.3	67.7	66.5	210	86	93	60	106	56
DEC 16 71	THU	15															
DEC 17 71	FRI	99															
DEC 18 71	SAT	15		30.5	30.5			76.7	82.7	68.9	66.2						
DEC 19 71	SUN	99															
DEC 20 71	MON	15		27.0	27.0			78.8	67.2	62.2	58.6						
DEC 21 71	TUE	99															
DEC 22 71	WED	99															
DEC 23 71	THU	99															
DEC 24 71	FRI	99															
DEC 25 71	SAT	99															
DEC 26 71	SUN	99															
DEC 27 71	MON	99															
DEC 28 71	TUE	15	21.6	18.9	18.9	84.0	76.0	82.8	68.2	71.0	64.9	150	47	30	24	53	47
DEC 29 71	WED	15		13.8	13.8			65.6	79.0	45.2	48.4						
DEC 30 71	THU	15	31.5	28.7	28.7	84.3	79.9	85.1	68.2	78.0	73.7	204	71	35	32	74	50
DEC 31 71	FRI	99															
JAN 1 72	SAT	99															
JAN 2 72	SUN	99															
JAN 3 72	MON	15		29.4	29.4			89.9	71.9	75.9	64.7						
JAN 4 72	TUE	15	32.4	24.0	24.0	83.1	88.7	88.9	88.4	65.0	69.3	189	54	42	32	71	35
JAN 5 72	WED	15		15.2	15.2			87.4	85.7	47.7	50.0						
JAN 6 72	THU	15	34.2	27.1	27.1	67.7	80.2	44.0	81.8	51.3	65.1	192	69	38	62	71	32
JAN 7 72	FRI	99															
JAN 8 72	SAT	15		12.3	12.3												
JAN 9 72	SUN	99															
JAN 10 72	MON	15		41.1	41.1			36.8	88.3	66.2	68.3						
JAN 11 72	TUE	15	27.7	22.2	22.2	75.0	72.9	58.1	79.7	57.1	53.2	96	51		24	41	26
JAN 12 72	WED	15		37.9	37.9			-9.3	47.0	66.9	63.3						
JAN 13 72	THU	99															
JAN 14 72	FRI	99															
JAN 15 72	SAT	15	32.6	23.2	23.2	54.3	58.7	17.2	-1.8	51.1	45.9	138	75	49	63	86	44
JAN 16 72	SUN	99															
JAN 17 72	MON	15		32.1	32.1			57.8	68.6	52.2	53.7						
JAN 18 72	TUE	15	41.4	38.0	38.0	78.5	64.4	96.5	62.9	74.2	65.2	177	78	74	38	78	75
JAN 19 72	WED	15		40.3	40.3			91.8	90.0	65.8	57.8						
JAN 20 72	THU	15	84.1	53.7	53.7	67.2	58.7	40.1	64.1	72.0	65.2	189	102	98	62	130	108
JAN 21 72	FRI	99															
JAN 22 72	SAT	15	41.3	27.2	27.2	74.6	62.4	85.0	71.7	69.7	55.5	181	84	72	46	94	68
JAN 23 72	SUN	99															
JAN 24 72	MON	15		41.8	41.8			57.2	75.4	46.3	73.8						

Date of Obs	Day of Week	Inf SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf C	P-1 C	S-1 C	P-2 C	S-2 C	Inf MO2	P-1 MO2	S-2 MO2
NOV 19 69	WED	93	55	48	108	40	126	58	33	38	65	43	42	
NOV 19 69	WED													
NOV 20 69	THU	246	73	47	37	88	55	49						
NOV 20 69	THU													
NOV 21 69	FRI	176	79	46	51	102	51	56						
NOV 21 69	FRI													
NOV 22 69	SAT	171	74	73	44	98	57	58						
NOV 22 69	SAT													
NOV 23 69	SUN	171	74	73	44	98	57	58						
NOV 23 69	SUN													
NOV 24 69	MON	209	43	50	64	135	107	65						
NOV 24 69	MON													
NOV 25 69	TUE	133	11	8	10	87	42	9						
NOV 25 69	TUE													
NOV 26 69	WED													
NOV 27 69	THU													
NOV 28 69	FRI	180	52	23	45	87	42	13						
NOV 28 69	FRI													
NOV 29 69	SAT	180	52	23	45	87	42	13						
NOV 29 69	SAT													
NOV 30 69	SUN	207	88	49	86	119	73	45						
NOV 30 69	SUN													
DEC 1 69	MON	155	58	37	39	96	57	47						
DEC 1 69	MON													
DEC 2 69	TUE	132	16	18	78	29	19	19						
DEC 2 69	TUE													
DEC 3 69	WED	199	48	28	43	86	47	43						
DEC 3 69	WED													
DEC 4 69	THU	171	53	24	25	82	47	34						
DEC 4 69	THU													
DEC 5 69	FRI	126	75	53	41	47	27	31						
DEC 5 69	FRI													
DEC 6 69	SAT	126	75	53	41	47	27	31						
DEC 6 69	SAT													
DEC 7 69	SUN	209	77	51	43	135	100	96						
DEC 7 69	SUN													
DEC 8 69	MON	186	62	36	39	88	51	39						
DEC 8 69	MON													
DEC 9 69	TUE	176	80	8	30	90	38	26						
DEC 9 69	TUE													
DEC 10 69	WED	139	22	1	9	19	11	9						
DEC 10 69	WED													
DEC 11 69	THU	168	45	31	21	67	42	32						
DEC 11 69	THU													
DEC 12 69	FRI	137	46	20	26	64	38	23						
DEC 12 69	FRI													
DEC 13 69	SAT	137	46	20	26	64	38	23						
DEC 13 69	SAT													
DEC 14 69	SUN	137	46	20	26	64	38	23						
DEC 14 69	SUN													
DEC 15 69	MON	222	62	36	42	101	51	23						
DEC 15 69	MON													
DEC 16 69	TUE	174	48	56	56	72	53	38						
DEC 16 69	TUE													
DEC 17 69	WED	169	73	43	37	67	58	40						
DEC 17 69	WED													

Date of Obsv	Day of Week	Samp Type	Inf SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf C	P-1 Ord C	S-1 Ord C	P-2 Ord C	S-2 Ord C	Inf MO2	P-1 MO2	S-1 MO2	P-2 MO2
FEB 9 70	MON	4	147	16	33	90	63	115	51	51	75	52	0.30	0.30	0.30	0.30
FEB 10 70	TUE	4	147	16	64	33	90	115	51	51	75	52	0.30	0.30	0.30	0.30
FEB 11 70	WED	4	232	72	48	127	92	139	65	57	85	69	0.30	0.30	0.30	0.30
FEB 12 70	THU	4	232	72	48	127	92	104	139	65	85	69	0.30	0.30	0.30	0.30
FEB 13 70	FRI	7	168	39	85	100	89	60	119	57	68	58	0.30	0.30	0.30	0.30
FEB 14 70	SAT	7	168	39	85	100	89	60	119	57	68	58	0.30	0.30	0.30	0.30
FEB 15 70	SUN	7	160	39	85	100	89	60	119	57	68	58	0.30	0.30	0.30	0.30
FEB 16 70	MON	4	192	84	64	120	68	62	126	60	47	43	0.30	0.30	0.30	0.30
FEB 17 70	TUE	4	192	84	64	120	68	62	126	60	47	43	0.30	0.30	0.30	0.30
FEB 18 70	WED	4	165	79	60	111	62	56	120	58	47	47	0.30	0.30	0.30	0.30
FEB 19 70	THU	4	165	79	60	111	62	56	120	58	47	47	0.30	0.30	0.30	0.30
FEB 20 70	FRI	7	215	48	23	41	77	53	137	55	38	38	0.30	0.30	0.30	0.30
FEB 21 70	SAT	7	215	48	23	41	77	53	137	55	38	38	0.30	0.30	0.30	0.30
FEB 22 70	SUN	7	215	48	23	41	77	53	137	55	38	38	0.30	0.30	0.30	0.30
FEB 23 70	MON	4	191	75	58	111	115	65	151	65	56	51	0.30	0.30	0.30	0.30
FEB 24 70	TUE	4	191	75	58	111	115	65	151	65	56	51	0.30	0.30	0.30	0.30
FEB 25 70	WED	4	247	40	37	20	67	54	146	55	49	37	0.30	0.30	0.30	0.30
FEB 26 70	THU	4	247	40	37	20	67	54	146	55	49	37	0.30	0.30	0.30	0.30
FEB 27 70	FRI	7	247	40	37	20	67	54	146	55	49	37	0.30	0.30	0.30	0.30
FEB 28 70	SAT	7	247	40	37	20	67	54	146	55	49	37	0.30	0.30	0.30	0.30
MAR 1 70	SUN	7	110	66	71	62	129	97	179	69	98	71	0.30	0.30	0.30	0.30
MAR 2 70	MON	4	110	66	71	62	129	97	179	69	98	71	0.30	0.30	0.30	0.30
MAR 3 70	TUE	4	99	48	69	28	87	42	108	51	55	40	0.30	0.30	0.30	0.30
MAR 4 70	WED	4	99	48	69	28	87	42	108	51	55	40	0.30	0.30	0.30	0.30
MAR 5 70	THU	7	123	42	33	22	71	62	24	112	48	39	0.30	0.30	0.30	0.30
MAR 6 70	FRI	7	123	42	33	22	71	62	24	112	48	39	0.30	0.30	0.30	0.30
MAR 7 70	SAT	7	123	42	33	22	71	62	24	112	48	39	0.30	0.30	0.30	0.30
MAR 8 70	SUN	7	123	42	33	22	71	62	24	112	48	39	0.30	0.30	0.30	0.30
MAR 9 70	MON	4	156	59	48	30	83	98	51	128	59	49	0.30	0.30	0.30	0.30
MAR 10 70	TUE	4	156	59	48	30	83	98	51	128	59	49	0.30	0.30	0.30	0.30
MAR 11 70	WED	4	168	55	42	27	90	71	90	56	48	43	0.30	0.30	0.30	0.30
MAR 12 70	THU	4	168	55	42	27	90	71	90	56	48	43	0.30	0.30	0.30	0.30
MAR 13 70	FRI	4	114	36	36	23	90	57	108	43	37	32	0.30	0.30	0.30	0.30
MAR 14 70	SAT	4	114	36	36	23	90	57	108	43	37	32	0.30	0.30	0.30	0.30
MAR 15 70	SUN	4	194	66	60	30	91	90	60	55	39	106	0.30	0.30	0.30	0.30
MAR 16 70	MON	4	194	66	60	30	91	90	60	55	39	106	0.30	0.30	0.30	0.30
MAR 17 70	TUE	4	176	70	102	59	138	119	52	58	46	73	0.30	0.30	0.30	0.30
MAR 18 70	WED	4	176	70	102	59	138	119	52	58	46	73	0.30	0.30	0.30	0.30
MAR 19 70	THU	4	176	70	102	59	138	119	52	58	46	73	0.30	0.30	0.30	0.30
MAR 20 70	FRI	4	176	70	102	59	138	119	52	58	46	73	0.30	0.30	0.30	0.30
MAR 21 70	SAT	4	121	79	75	63	137	109	61	52	40	113	0.30	0.30	0.30	0.30
MAR 22 70	SUN	4	121	79	75	63	137	109	61	52	40	113	0.30	0.30	0.30	0.30
MAR 23 70	MON	4	121	79	75	63	137	109	61	52	40	113	0.30	0.30	0.30	0.30
MAR 24 70	TUE	4	220	129	236	624	160	98	91	65	91	88	0.05	0.05	0.05	0.05
MAR 25 70	WED	4	220	129	236	624	160	98	91	65	91	88	0.05	0.05	0.05	0.05
MAR 26 70	THU	4	220	129	236	624	160	98	91	65	91	88	0.05	0.05	0.05	0.05
MAR 27 70	FRI	4	220	129	236	624	160	98	91	65	91	88	0.05	0.05	0.05	0.05
MAR 28 70	SAT	4	140	75	45	58	108	71	99	54	49	78	0.30	0.30	0.30	0.30
MAR 29 70	SUN	4	140	75	45	58	108	71	99	54	49	78	0.30	0.30	0.30	0.30
MAR 30 70	MON	4	140	75	45	58	108	71	99	54	49	78	0.30	0.30	0.30	0.30
MAR 31 70	TUE	4	140	75	45	58	108	71	99	54	49	78	0.30	0.30	0.30	0.30
APR 1 70	WED	4	140	75	45	58	108	71	99	54	49	78	0.30	0.30	0.30	0.30
APR 2 70	THU	4	140	75	45	58	108	71	99	54	49	78	0.30	0.30	0.30	0.30

Date of Obs	Day of Week	Stap	Inf SS	P-1 SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf Ord C	P-1 Ord C	S-1 Ord C	P-2 Ord C	S-2 Ord C	Inf MO2	P-1 MO2	P-1 MO2
APR 1 70	FRI	7	100	48	26	84	104	54	105	60	32	73	59	0.30	0.30	0.30
APR 8 70	SAT	7	100	48	26	84	104	54	105	60	32	73	59	0.30	0.30	0.30
APR 9 70	SUN	7	100	48	26	84	104	54	105	60	32	73	59	0.30	0.30	0.30
APR 10 70	MON	4	145	44	159	28	105	84	107	62	42	73	70	0.30	0.30	0.30
APR 11 70	TUE	4	145	44	159	28	105	84	107	62	42	73	70	0.30	0.30	0.30
APR 12 70	WED	4	122	68	51	27	121	86	118	65	46	86	76	0.30	0.30	0.30
APR 13 70	THU	4	122	68	51	27	121	86	118	65	46	86	76	0.30	0.30	0.30
APR 14 70	FRI	7	176													
APR 15 70	SAT	7	176													
APR 16 70	SUN	4	176													
APR 17 70	MON	7	146													
APR 18 70	TUE	7	146													
APR 19 70	WED	7	146													
APR 20 70	THU	7	146													
APR 21 70	FRI	7	207													
APR 22 70	SAT	7	207													
APR 23 70	SUN	7	207													
APR 24 70	MON	4	186													
APR 25 70	TUE	4	186													
APR 26 70	WED	4	186													
APR 27 70	THU	4	186													
APR 28 70	FRI	4	186													
APR 29 70	SAT	4	186													
APR 30 70	SUN	4	186													
MAY 1 70	MON	7	186													
MAY 2 70	TUE	7	186													
MAY 3 70	WED	7	186													
MAY 4 70	THU	4	401													
MAY 5 70	FRI	4	401													
MAY 6 70	SAT	4	193													
MAY 7 70	SUN	6	218													
MAY 8 70	MON	6	218													
MAY 9 70	TUE	6	218													
MAY 10 70	WED	6	218													
MAY 11 70	THU	6	218													
MAY 12 70	FRI	6	218													
MAY 13 70	SAT	6	218													
MAY 14 70	SUN	6	218													
MAY 15 70	MON	6	218													
MAY 16 70	TUE	6	218													
MAY 17 70	WED	6	218													
MAY 18 70	THU	6	218													
MAY 19 70	FRI	6	218													
MAY 20 70	SAT	6	218													
MAY 21 70	SUN	6	218													
MAY 22 70	MON	6	218													
MAY 23 70	TUE	6	218													
MAY 24 70	WED	6	218													
MAY 25 70	THU	6	218													
MAY 26 70	FRI	6	218													
MAY 27 70	SAT	6	218													
MAY 28 70	SUN	6	218													
MAY 29 70	MON	6	218													
MAY 30 70	TUE	6	218													
MAY 31 70	WED	6	218													

Date of Obsv	Day of Week	Stap Type	Inf SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf C	P-1 MO2	S-2 C	P-2 C	S-1 C	P-1 C	S-1 C	P-2 C	S-2 C	P-1 MO2	S-2 C
MAY 26 7C	TUE	6	198	57	67	58	37	132	75	87	42	44	35	55	53	40	0.02	0.25
MAY 27 7C	WED	6	124	66	66	180	89	92	69	142	45	43	40	58	43	39	0.01	0.46
MAY 28 7C	THU	6	104	31	30	22	45	35	19	109	39	37	30	54	42	38	0.01	0.87
MAY 29 7C	FRI	6	88	12	32	18	40	41	14	113	36	32	29	52	46	34	0.01	0.02
MAY 30 7C	SAT	6	286	48	42	37	97	37	25	129	52	36	34	66	57	46	0.01	0.08
JUN 1 7C	SUN	6	139	21	28	47	189	13	87	43	34	32	32	51	55	35	0.01	0.24
JUN 2 7C	MON	6	166	64	25	21	61	44	10	78	57	30	39	52	46	40	0.10	0.50
JUN 3 7C	TUE	9	201	64	38	27	63	31	114	57	37	46	68	46	39	0.10	0.10	0.50
JUN 4 7C	WED	9	171	36	12	8	77	16	142	48	34	28	28	63	46	48	0.01	0.01
JUN 5 7C	THU	6	160	30	31	19	50	57	38	132	49	42	32	65	54	43	0.10	0.33
JUN 6 7C	FRI	6	103	12	39	21	49	32	99	49	49	39	33	78	61	46	0.10	0.10
JUN 7 7C	SAT	6	165	39	65	41	84	56	57	124	51	58	42	70	61	61	0.10	0.27
JUN 8 7C	SUN	6	269	52	30	26	60	40	45	132	51	38	37	61	42	40	0.01	0.01
JUN 9 7C	MON	6	158	44	61	25	67	51	40	104	54	44	34	66	46	48	0.01	0.01
JUN 10 7C	TUE	6	124	38	31	15	47	61	16	105	50	48	39	59	67	44	0.10	0.31
JUN 11 7C	WED	6	153	43	41	40	61	48	36	104	47	48	39	52	52	50	0.05	0.05
JUN 12 7C	THU	6	224	46	43	32	68	43	40	121	10	50	39	71	53	49	0.05	0.30
JUN 13 7C	FRI	6	157	48	54	25	63	34	134	69	49	39	39	78	47	47	0.05	0.05
JUN 14 7C	SAT	6	162	52	40	30	76	131	45	179	70	44	37	72	97	50	0.05	0.35
JUN 15 7C	SUN	6	161	49	52	42	88	76	51	100	50	39	43	67	66	48	0.05	0.75
JUN 16 7C	MON	6	161	23	28	19	70	39	30	104	43	40	35	70	51	41	0.05	0.30
JUN 17 7C	TUE	6	131	19	23	15	62	46	22	114	45	34	33	65	69	44	0.05	0.55
JUN 18 7C	WED	6	126	28	45	64	64	48	34	125	41	49	49	57	44	38	0.05	0.50
JUN 19 7C	THU	6	128	25	11	9	46	28	13	109	40	29	30	54	35	29	0.01	0.27
JUN 20 7C	FRI	6	136	25	24	14	57	35	102	42	42	33	30	62	46	42	0.01	0.19
JUN 21 7C	SAT	6	139	24	29	16	65	35	28	131	45	34	33	62	47	45	0.01	0.07
JUN 22 7C	SUN	6	132	18	23	11	55	38	18	115	30	26	28	47	43	34	0.01	0.18
JUN 23 7C	MON	6	135	22	17	11	65	39	24	99	34	26	25	52	42	35	0.01	0.27

Date of Obs	Day of Week	Samp Type	Inf SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf Org C	P-1 Org C	P-1 Org C	P-2 Org C	P-2 Org C	S-1 Org C	Inf MO2	P-1 MO2	P-1 MO2
JUL 18 70	SAT															
JUL 19 70	SUN	6														
JUL 20 70	MON	6														
JUL 21 70	TUE															
JUL 22 70	WED															
JUL 23 70	THU	6	216	56	43	31	49	60	48	139	63	55	48	49	47	42
JUL 24 70	FRI															
JUL 25 70	SAT	6	174	37	60	19	46	41	31	93	46	50	37	44	35	33
JUL 26 70	SUN	6	152	41	40	16	44	37	19	148	58	53	41	42	34	31
JUL 27 70	MON	6	119	44	45	32	53	99	43	80	72	65	60	72	64	44
JUL 28 70	TUE															
JUL 29 70	WED															
JUL 30 70	THU															
JUL 31 70	FRI															
AUG 1 70	SAT															
AUG 2 70	SUN															
AUG 3 70	MON															
AUG 4 70	TUE															
AUG 5 70	WED	6	185	38	43	35	54	48	33	113	54	46	41	44	46	39
AUG 6 70	THU	6	156	37	18	19	41	19	17	100	52	38	40	45	35	33
AUG 7 70	FRI															
AUG 8 70	SAT	6	186	14		20	36	46	23	116	52	38	43	48	40	37
AUG 9 70	SUN	6	258	32	26	24	50	46	24	96	39	38	35	43	40	37
AUG 10 70	MON															
AUG 11 70	TUE	6	252	44	37	21	40	23	17	109	62	47	42	52	38	38
AUG 12 70	WED	6	173	46	46	19	47	49	17	118	59	49	40	50	35	35
AUG 13 70	THU															
AUG 14 70	FRI															
AUG 15 70	SAT	6	128	24	22	16	23	23	13	120	50	45	39	40	30	30
AUG 16 70	SUN	6	322	45	22	14	43	22	10	161	63	44	42	48	37	32
AUG 17 70	MON	11	212	19	27	21	35	11	33	159	60	46	33	51	32	39
AUG 18 70	TUE															
AUG 19 70	WED	6	131	37	16	13	28	15	9	115	62	41	40	50	33	33
AUG 20 70	THU															
AUG 21 70	FRI															
AUG 22 70	SAT															
AUG 23 70	SUN	6	133	29	19	12	29	26	10	87	45	35	31	43	33	29
AUG 24 70	MON	6	109	33	10	9	27	13	9	92	47	31	27	37	24	27
AUG 25 70	TUE	6	344	57	31	17	43	24	22	181	66	43	39	48	30	34
AUG 26 70	WED	6	126	46	29	25	39	142	12	97	48	38	36	44	68	26
AUG 27 70	THU															
AUG 28 70	FRI															
AUG 29 70	SAT	6	109	37	24	13		21	9	73	50	37	34	34	32	30
AUG 30 70	SUN	6	151	23	13	8	14	8	5	90	47	34	33	43	27	28
SEP 1 70	MON	6	235	42	24	12	38	29	12	94	47	34	29	48	32	28
SEP 2 70	TUE	6	166	55	37	21	52	29	16	88	44	44	38	62	37	34
SEP 3 70	WED	6	127	29	29	12	56	13	20	95	46	54	37	62	33	37
SEP 4 70	THU															
SEP 5 70	FRI															
SEP 6 70	SAT	6	201	39	10	11	65	8	12	148	60	31	29	55	29	28
SEP 7 70	SUN	6	131	39	24	8	33	31	13	14	53	38	30	54	45	37
SEP 8 70	MON	11														
SEP 9 70	TUE															
SEP 10 70	WED	6	193	36	21	14	34	21	15	128	47	37	36	55	35	33
SEP 11 70	THU	10														
SEP 12 70	FRI															
SEP 13 70	SAT															
SEP 14 70	SUN															
SEP 15 70	MON															
SEP 16 70	TUE															
SEP 17 70	WED															
SEP 18 70	THU															
SEP 19 70	FRI															
SEP 20 70	SAT															
SEP 21 70	SUN															
SEP 22 70	MON															
SEP 23 70	TUE															
SEP 24 70	WED															
SEP 25 70	THU															
SEP 26 70	FRI															
SEP 27 70	SAT															
SEP 28 70	SUN															
SEP 29 70	MON															
SEP 30 70	TUE															
SEP 31 70	WED															

Date of Obs	Day of Week	Sam Type	Inf SS	P-1 SS	P-1 SS	P-2 SS	P-2 SS	S-2 SS	Inf C	P-1 C	S-1 C	P-2 C	P-2 C	S-2 C	Inf C	P-1 C	P-1 C	P-1 C
SEP 11 70	FRI																	
SEP 12 70	SAT	6	96	36	15	16	46	26	10	94	50	31	59	41	34	0.01	0.01	0.12
SEP 13 70	SUN	12																
SEP 14 70	SUN	6	88	40	21	12	139	45	20	80	55	31	30	44	39	0.01	0.01	0.12
SEP 15 70	TUE	6	166	39	19	8	42	32		103	61	33	28	66		0.01	0.01	0.12
SEP 16 70	TUE	12																
SEP 17 70	TUE	6	168	50	38	14	47	37	17	91	59	38	29	67	34	0.01	0.01	0.12
SEP 18 70	TUE	12																
SEP 19 70	TUE	6	144	38	23		49	37	16	151	64	40	48	49	43			
SEP 20 70	FRI																	
SEP 21 70	SAT	6	103	35	127	11	32	60	14	114	68	23	33	62	44	0.01	0.01	0.11
SEP 22 70	SUN	12																
SEP 23 70	SUN	6	157	42	29	9	51	46	18	104	61	32	29	64	41			
SEP 24 70	TUE	6	190	52	17	12	52	58	18	153	68	41	39	22	63	0.01	0.01	0.11
SEP 25 70	TUE	12																
SEP 26 70	TUE	6	189	49	57	15	57	79	58	125	51	36	30	56	37	0.01	0.01	0.11
SEP 27 70	TUE	12																
SEP 28 70	TUE	6	143	56	35	14	61	43	30	108	69	38	39	77	47	0.01	0.01	0.11
SEP 29 70	FRI																	
SEP 30 70	SAT	6	187	40		18	51	65	21	103	54	43	35	59	43	0.01	0.01	0.16
SEP 31 70	SUN	12																
SEP 32 70	SUN	6	167	72	31	24	57	27	30	118	71	49	71	73	51			
SEP 33 70	SUN	6	142	71	39	17	54	33	30	123	70	44	37	70	54	0.01	0.01	0.16
SEP 34 70	TUE	12																
SEP 35 70	TUE	6	150		46	17	66	47	26	112	63	50	36	69	50	0.01	0.01	0.16
SEP 36 70	TUE	12																
SEP 37 70	TUE	6	183	54	36	22	73		31	116	62	48	42	84	53	0.01	0.01	0.16
SEP 38 70	FRI																	
SEP 39 70	SAT																	
SEP 40 70	SUN	4	159	15	18	12	60	71	20	100	40	36	33	63	43	0.01	0.70	0.25
SEP 41 70	SUN	13	238	36	21	27	56	106	38	90	52	46	57	71	70			
SEP 42 70	SUN	6	113				52	30	46	96			95	85	75	0.01	0.70	0.25
SEP 43 70	TUE	4																
SEP 44 70	TUE																	
SEP 45 70	TUE																	
SEP 46 70	TUE																	
SEP 47 70	TUE																	
SEP 48 70	TUE																	
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SEP 96 70	TUE																	
SEP 97 70	TUE																	
SEP 98 70	TUE																	
SEP 99 70	TUE																	
SEP 100 70	TUE																	

Date of Obs	Day of Week	Sam Type	Inf SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf Orq C	P-1 Orq C	S-1 Orq C	P-2 Orq C	S-2 Orq C	Inf MC2	P-1 MC2	S-1 MC2
OCT 21 70	WED	6	227	85	31	82	41	95	51	40	67	57	0.01	0.32	0.32
OCT 22 70	THU	6	142	67	18	71	84								
OCT 23 70	FRI	12													
OCT 24 70	SAT														
OCT 25 70	SUN	13	188	55	27	65	38	109	66	59	43	26	0.01	0.19	0.36
OCT 26 70	MON	6	196	48	24	79	50	126	60	47	83	57	0.01	0.19	0.36
OCT 27 70	TUE	6	170	39	28	80	30	127	62	57	68	65	0.01	0.19	0.36
OCT 28 70	WED	6	207	37	29	79	50	110	47	39	71	57	0.01	0.19	0.36
OCT 29 70	THU	6	283	313	362	469	441	130	135	131	106	137	0.01	0.19	0.36
OCT 30 70	FRI	12													
OCT 31 70	SAT														
NOV 1 70	SUN	6	142	29	31	76	66	97	35	32	27	45	0.01	0.38	0.41
NOV 2 70	MON	10													
NOV 3 70	TUE	6													
NOV 4 70	WED														
NOV 5 70	THU	6	331	173	67	32	146	95	65	50	94	79	0.01	0.38	0.41
NOV 6 70	FRI	10													
NOV 7 70	SAT														
NOV 8 70	SUN	6	224	131	55	19	55	136	90	61	47	59	0.02	0.35	0.40
NOV 9 70	MON	10	203	46	38	25	86	110	61	53	50	51	0.02	0.35	0.40
NOV 10 70	TUE	6	154	53	60	41	130	90	34	34	22	36	0.02	0.35	0.40
NOV 11 70	WED	10													
NOV 12 70	THU	6	129	34	49	16	74	81	36	31	27	34			
NOV 13 70	FRI														
NOV 14 70	SAT														
NOV 15 70	SUN														
NOV 16 70	MON														
NOV 17 70	TUE														
NOV 18 70	WED														
NOV 19 70	THU														
NOV 20 70	FRI														
NOV 21 70	SAT														
NOV 22 70	SUN														
NOV 23 70	MON	6	154	38	50	33	91	127	48	47	43	64	0.01	0.40	0.33
NOV 24 70	TUE														
NOV 25 70	THU														
NOV 26 70	FRI														
NOV 27 70	SAT														
NOV 28 70	SUN	6	190	43	45	17	72	131	47	51	40	73			
NOV 29 70	MON	6	227	68	43	37	88	129	61	50	46	79	0.01	0.49	0.27
NOV 30 70	TUE	6	209	42	32	20	95	127	48	38	35	70			
DEC 1 70	WED	12													
DEC 2 70	THU	6	164	104	42	26	76	133	74	50	48	75			
DEC 3 70	FRI	6	134	25	35	47	76	116	44	51	46	79			

Date of Obsv	Day of Week	Temp	Inf SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf C	P-1 C	S-1 C	P-2 C	S-2 C	Inf MO2	P-1 MO2	S-1 MO2	P-2 MO2
DEC 3 70	THU	12											0.01	0.49		0.27
DEC 4 70	FRI	99														
DEC 5 70	SAT	99														
DEC 6 70	SUN	6	213	35	20	92	81	57	109	37	32	26	0.02	0.62	0.45	
DEC 7 70	MON	99														
DEC 8 70	TUE	6	212	78	60	44	115	149	106	132	52	44	0.02	0.62	0.45	
DEC 9 70	WED	6	173	60	28	101	91	74	137	55	44	37	0.02	0.62	0.45	
DEC 10 70	THU	6	170	59	22	67	48	74	153	61	39	99	0.02	0.62	0.45	
DEC 11 70	FRI	99														
DEC 12 70	SAT	99														
DEC 13 70	SUN	6	126	22	12	28	46	28	114	40	35	40	0.02	0.59	0.41	
DEC 14 70	MON	6	167	20	21	10	63	46	55	143	41	34	0.02	0.59	0.41	
DEC 15 70	TUE	6	122	36	13	8	19	29	53	124	26	28	0.06	0.68	0.49	
DEC 16 70	WED	11	361	54	27	30	108	66	218	55	39	41	0.05	0.80	0.40	
DEC 17 70	THU	6	113	22	14	9	65	52	118	30	26	25	0.02	0.51	0.31	
DEC 18 70	FRI	6	124	8	8	3	57	41	109	34	25	32	0.02	0.51	0.31	
DEC 19 70	SAT	6	145	11	20	3	78	37	45	107	26	22				
DEC 20 70	SUN	99														
DEC 21 70	MON	99														
DEC 22 70	TUE	99														
DEC 23 70	WED	99														
DEC 24 70	THU	99														
DEC 25 70	FRI	99														
DEC 26 70	SAT	99														
DEC 27 70	SUN	6	131	24	11	7	44	23	92	30	23	22	0.04	0.63	0.31	
DEC 28 70	MON	6	222	34	18	10	61	79	146	37	23	25	0.10	0.76	0.40	
DEC 29 70	TUE	6	203	50	18	18	88	55	48	133	42	25				
DEC 30 70	WED	6	163	29	19	20	98	48	38	121	42	32				
DEC 31 70	THU	99														
JAN 1 71	FRI	99														
JAN 2 71	SAT	99														
JAN 3 71	SUN	6	168	36	40	11	59	50	39	99	32	20	0.02	0.75	0.35	
JAN 4 71	MON	6	224	38	29	24	105	115	73	120	30	24	0.03	0.22	0.04	
JAN 5 71	TUE	6	131	28	76	14	72	19	49	82	27	46				
JAN 6 71	WED	6	134	34	15	12	79	73	81	104	28	22	0.03	0.59	0.29	
JAN 7 71	THU	6	130	48	16	14	82	116	55	84	39	27				
JAN 8 71	FRI	99														
JAN 9 71	SAT	99														
JAN 10 71	SUN	6	165	24	14	14	65	45	78	100	37	33	0.02	0.55	0.27	
JAN 11 71	MON	6	120	61	15	17	105	120	82	77	38	21	0.01	0.04	0.05	
JAN 12 71	TUE	6	105	22	23	16	30	37	103	57	36	39	0.01	0.04	0.05	
JAN 13 71	WED	6	160	27	12	12	78	49	90	35	21	27				
JAN 14 71	THU	6	160	37	14	15	67	69	92	140	49	33	0.01	0.04	0.06	
JAN 15 71	FRI	99														
JAN 16 71	SAT	99														
JAN 17 71	SUN	6	188	37	12	21	92	82	64	124	33	24	0.01	0.10	0.12	
JAN 18 71	MON	6	180	67	38	16	94	153	80	138	37	27	0.01	0.01	0.03	
JAN 19 71	TUE	6	158	60	32	39	99	89	72	138	66	47	0.01	0.01	0.03	
JAN 20 71	WED	6	144	27	31	27	106	74	68	101	60	40				
JAN 21 71	THU	6	200	70	34	21	102	101	87	128	78	43	0.01	0.02	0.03	
JAN 22 71	FRI	99														
JAN 23 71	SAT	99														

Date of Obs	Day of Week	Samp Type	Tnf SS	P-1 SS	P-1 SS	S-1 SS	P-2 SS	P-2 SS	S-2 SS	Inf Orq C	P-1 Orq C	S-1 Orq C	P-2 Orq C	P-2 Orq C	S-2 Orq C	Int NO2	P-1 NO2	P-1 NO2
JAN 28 71	SUN	6	180	82	26	11	18	72	19	123	61	19	88	83	55	0.02	0.03	0.05
JAN 29 71	MON	6	161	59	21	20	111	95	63	115	60	42	37	68	55	0.01	0.01	0.03
JAN 30 71	TUE	6	160	61	34	24	118	85	70	104	57	34	28	75	54	0.01	0.01	0.03
JAN 31 71	WED	6	132	52	19	16	104	72	58	108	74	36	15	67	48	0.01	0.04	0.03
JAN 24 71	THU	6	119	50	20	15	117	81	46	124	60	50	17	70	58	0.01	0.04	0.03
JAN 29 71	FRI	99																
JAN 30 71	SAT	99																
JAN 31 71	SUN	99																
FEB 1 71	MON	6	211	55	21	33	180	98	94	174	71	51	52	96	79	0.02	0.01	0.02
FEB 2 71	TUE	6	192	56	33	49	187	104	58	132	67	47	53	112	78	0.02	0.01	0.02
FEB 3 71	WED	6	158	80	77	43	122	90	67	123	81	66	66	100	82	0.01	0.01	0.01
FEB 4 71	THU	6	129	55	50	13	80	71	61	104	66	69	86	74	57	0.01	0.01	0.01
FEB 5 71	FRI	99																
FEB 6 71	SAT	99																
FEB 7 71	SUN	6	130	59	12	22	81	67	35	96	53	33	37	61	48	0.10	0.10	0.10
FEB 8 71	MON	6	117	89	46	54	71	74	77	77	62	42	46	63	37	0.10	0.10	0.10
FEB 9 71	TUE	6	123	88	41	47	65	50	78	99	71	84	58	78	59	0.10	0.10	0.10
FEB 10 71	WED	6	195	101	66	70	101	116	70	119	81	61	62	84	77	0.10	0.10	0.10
FEB 11 71	THU	6	129	86	88	68	72	105	55	150	89	80	75	82	78	0.10	0.10	0.10
FEB 12 71	FRI	99																
FEB 13 71	SAT	99																
FEB 14 71	SUN	6	163	155	71	52	127	112	92	107	83	48	49	70	61	0.01	0.01	0.03
FEB 15 71	MON	6	176	135	106	90	96	162	94	118	93	81	67	73	76	0.01	0.01	0.01
FEB 16 71	TUE	6	139	87	83	83	177	93	40	122	76	77	70	87	85	0.01	0.01	0.01
FEB 17 71	WED	6	98	119	71	73	91	97	108	114	70	62	58	64	65	0.01	0.01	0.01
FEB 18 71	THU	6	169	78	86	69	105	100	88	154	78	69	74	75	70	0.01	0.01	0.01
FEB 19 71	FRI	99																
FEB 20 71	SAT	99																
FEB 21 71	SUN	6	188	115	103	111	124	143	111	157	111	94	77	96	91	0.01	0.01	0.01
FEB 22 71	MON	6	196	84	79	77	95	138	131	129	86	91	78	97	91	0.01	0.01	0.01
FEB 23 71	TUE	6	154	74	166	68	94	99	51	115	80	101	76	84	75	0.01	0.01	0.01
FEB 24 71	WED	6	128	79	77	58	85	96	54	91	80	77	68	69	62	0.01	0.01	0.01
FEB 25 71	THU	6	157	93	90	74	100	97	70	123	79	75	70	71	69	0.01	0.01	0.01
FEB 26 71	FRI	99																
FEB 27 71	SAT	99																
FEB 28 71	SUN	6	165	98	107	78	109	111	58	95	65	66	62	79	67	0.02	0.02	0.01
MAR 1 71	MON	6	186	77	83	55	108	80	50	120	68	79	61	73	58	0.02	0.02	0.02
MAR 2 71	TUE	6	170	104	67	62	73	87	74	101	71	68	66	75	63	0.02	0.02	0.02
MAR 3 71	WED	6	160	86	68	59	86	72	44	85	56	48	38	58	35	0.01	0.01	0.01
MAR 4 71	THU	6																
MAR 5 71	FRI	99																
MAR 6 71	SAT	99																
MAR 7 71	SUN	6	125	98	84	71	100	108	51	78	69	58	59	66	61	0.02	0.02	0.03
MAR 8 71	MON	6	186	93	138	92	181	220	149	96	72	72	70	92	109	0.02	0.02	0.01
MAR 9 71	TUE	6	166	94	73	47	106	91	68	103	62	58	52	76	61	0.02	0.02	0.01
MAR 10 71	WED	6																
MAR 11 71	THU	6	179	81	9	55	82	63	44	124	78	72	64	81	68	0.02	0.02	0.01
MAR 12 71	FRI	99																
MAR 13 71	SAT	99																
MAR 14 71	SUN	6	103	74	65	41	97	82	47	105	71	69	50	76	75	0.02	0.02	0.01
MAR 15 71	MON	6	240	162	116	87	168	155	166	121	87	74	69	88	84	0.02	0.02	0.01
MAR 16 71	TUE	6	153	92	85	53	120	83	53	135	77	69	56	78	66	0.02	0.02	0.01
MAR 17 71	WED	6	165	86	48	46	86	90	42	127	82	74	67	78	79	0.02	0.02	0.01

Date of Obs	Day of Week	Stamp Type	Inf SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf Org C	P-1 Org C	S-1 Org C	P-2 Org C	S-2 Org C	Inf MO2	P-1 MO2	F-1 MO2
MAR 16 71	THU	6						95	72	68	71	72			
MAR 19 71	FRI	99													
MAR 20 71	SAT	99													
MAR 21 71	SUN	6	163	73	66	59	91	107	68	132	70	82	63		
MAR 22 71	MON	6	195	98	88	61	122	154	90	160	61	80	54		
MAR 23 71	TUE	6	152	139	122	76	94	82	90	101	110	112	93	0.01	0.01
MAR 24 71	WED	6													
MAR 25 71	THU	6	170	78	122	60	142	152	61						
MAR 26 71	FRI	99													
MAR 27 71	SAT	99													
MAR 28 71	SUN	6	143	89	132	72	111	174	74	90	64	73	54		
MAR 29 71	MON	6	141	111	177	118	144	168	89	96	67	72	54		
MAR 30 71	TUE	6	156	65	107	69	92	96	94	96	64	84	57		
MAR 31 71	WED	6	144	70	122	79	90	91	45	95	64	67	73	61	63
APR 1 71	THU	6													
APR 2 71	FRI	99													
APR 3 71	SAT	99													
APR 4 71	SUN	6	178	66	111	56	99	122	39	97	53	58	46	65	62
APR 5 71	MON	6	170	164	115	68	131	130	60	101	59	53	51	63	61
APR 6 71	TUE	6	171	115	92	63	109	78	56	111	79	56	49	81	62
APR 7 71	WED	6	190	72	91	52	121	110	77	94	39	46	35	61	52
APR 8 71	THU	6	161	71	80	89	95	154	57	116	69	70	55	79	116
APR 9 71	FRI	99													
APR 10 71	SAT	99													
APR 11 71	SUN	99													
APR 12 71	MON	6	216	112	105	67	128	175	95	118	73	68	59	96	108
APR 13 71	TUE	6	222	113	71	72	102	128	103	156	80	66	68	89	93
APR 14 71	WED	6													
APR 15 71	THU	6	163	81	42	63	87	107	58	133	77	67	67	92	94
APR 16 71	FRI	99													
APR 17 71	SAT	99													
APR 18 71	SUN	6	158	55	62	33	86	125	56	149	76	79	59	89	98
APR 19 71	MON	6	196	54	53	29	85	89	39	147	67	56	46	79	83
APR 20 71	TUE	6	216	59	84	59	98	74	78	125	59	59	50	78	55
APR 21 71	WED	6	193	50	38	19	58	54	48	124	51	42	43	63	59
APR 22 71	THU	6													
APR 23 71	FRI	99													
APR 24 71	SAT	99													
APR 25 71	SUN	6	233	36	50	24	78	107	29	140	51	41	41	74	79
APR 26 71	MON	6	158	95	111	52	121	126	67	97	56	60	48	71	76
APR 27 71	TUE	6	213	63	59	43	86	83	53	174	77	61	56	90	85
APR 28 71	WED	6													
APR 29 71	THU	6	181	65	79	77	85	98	72	116	64	57	50	73	71
APR 30 71	FRI	99													
MAY 1 71	SAT	99													
MAY 2 71	SUN	6	205	86	350	90	90	159	64	110	64	147	75	77	76
MAY 3 71	MON	6	165	60	55	83	72	43	65	128	68	50	52	69	58
MAY 4 71	TUE	6	158	94	65	64	94	83	55	139	63	55	61	69	64
MAY 5 71	WED	99													
MAY 6 71	THU	6	222	56	73	94	96	104	103	128	53	44	62	56	63
MAY 7 71	FRI	99													
MAY 8 71	SAT	99													
MAY 9 71	SUN	6	276	92	64	72	72	126	172	73	49	49			70

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Date of Obsv	Day of Week	Seap type	Taf SS	P-1 SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Inf Orq C	P-1 Orq C	S-1 Orq C	P-2 Orq C	S-2 Orq C	Inf MO2	P-1 MO2	P-1 MO2
MAY 10 71	MON	99														
MAY 11 71	TUE	99														
MAY 12 71	WED	99														
MAY 13 71	THU	99														
MAY 14 71	FRI	99														
MAY 15 71	SAT	99														
MAY 16 71	SUN	6	146	61	43	51	97	66	135	63	60	55	87	64	56	
MAY 17 71	MON	6	216	35	26	22	54	64	33	145	65	50	74	64	48	
MAY 18 71	TUE	6	170	34	21	23	44	64	21	211	91	74	97	89	69	
MAY 19 71	WED	99														
MAY 20 71	THU	6	175	37	34	14	38	72	33	137	77	61	79	81	61	
MAY 21 71	FRI	99														
MAY 22 71	SAT	99														
MAY 23 71	SUN	6	167	36	37	19	35	64	23	168	74	65	74	69	58	
MAY 24 71	MON	6														
MAY 25 71	TUE	6	149	27	16	9	37	21	10	162	88	67	62	102	78	68
MAY 26 71	WED	6	145	7	33	15	34	22	15	171	84	73	56	87	71	63
MAY 27 71	THU	6	132	26	16	19	30	21	34	153	68	56	49	77	68	65
MAY 28 71	FRI	99														
MAY 29 71	SAT	99														
MAY 30 71	SUN	99														
MAY 31 71	MON	6	87	26	9	12	42	20	16	86	51	31	66	41	37	
JUN 1 71	TUE	6	101	50	37	12	61	27	13	172	96	66	41	94	68	52
JUN 2 71	WED	6	231	50	23	26	57	44	21	192	85	62	60	94	77	65
JUN 3 71	THU	6	166	30	14	15	14	22	52	177	71	50	48	73	63	54
JUN 4 71	FRI	99														
JUN 5 71	SAT	99														
JUN 6 71	SUN	6	221	52	58	41	79	71	41	130	45	65	37	65	36	
JUN 7 71	MON	6														
JUN 8 71	TUE	6														
JUN 9 71	WED	6														
JUN 10 71	THU	6	194	57	79	32	60	39	25	126	59	51	44	60	48	41
JUN 11 71	FRI	99														
JUN 12 71	SAT	99														
JUN 13 71	SUN	6	198	42	37	19	38	42	25							
JUN 14 71	MON	6	183	51	34	13	27	13								
JUN 15 71	TUE	6	196	57	29	28	92	43	34							
JUN 16 71	WED	6	173	35	42	14	35	25	13							
JUN 17 71	THU	99														
JUN 18 71	FRI	99														
JUN 19 71	SAT	99														
JUN 20 71	SUN	99														
JUN 21 71	MON	99														
JUN 22 71	TUE	6	247	58	79	61	63	40	44	120	67	68	66	59	43	37
JUN 23 71	WED	99														
JUN 24 71	THU	6														
JUN 25 71	FRI	99														
JUN 26 71	SAT	6	164	30	20	20	36	23	15	112	49	33	36	48	37	32
JUN 27 71	SUN	99														
JUN 28 71	MON	6	208	41	64	23	52	41	19	116	57	55	40	48	52	30
JUN 29 71	TUE	6														
JUN 30 71	WED	6	170	55	44	28	57	47	21	113	60	52	41	49	47	35
JUL 1 71	THU	6														

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Date of Obsv	Day of Week	Samp Type	Inf SS	P-1 SS	F-1 SS	S-1 SS	P-2 SS	F-2 SS	S-2 SS	Inf C	P-1 C	F-1 C	S-1 C	P-2 C	F-2 C	S-2 C	Inf M02	P-1 M02	F-1 M02
JUL 2 71	FRI	99																	
JUL 3 71	SAT	99																	
JUL 4 71	SUN	99																	
JUL 5 71	MON	6	219	47	45	30	69	74	20	119	50	40	38	49	43	29			
JUL 6 71	TUE	6	172	86	36	24	36	27	41	103	67	40	29	42	32	36			
JUL 7 71	WED	6								133	51	43	35	45	44	41	0.01	0.02	0.11
JUL 8 71	THU	6	142	36	35	37	59	51	35	122	69	47	43	45					
JUL 9 71	FRI	99																	
JUL 10 71	SAT	6	126	41	17	16	40	22	10	113	75	38	36	48	37	34			
JUL 11 71	SUN	99																	
JUL 12 71	MON	6	118	35	28	9	47	51	11	66	46	44	34	52	54	33			
JUL 13 71	TUE	6	146	47	39	25	53	37	39	117	76	39	32	55	33	36			
JUL 14 71	WED	6	194	58	59	13	70	24	10	118	79	53	32	56	33	29			
JUL 15 71	THU	6	143	43	41	15	29	33	8	126	86	58	35	45	39	28	0.01	0.01	0.14
JUL 16 71	FRI	99																	
JUL 17 71	SAT	6	139	46	43	14	50	29	13	122	100	50	37	57	34	28			
JUL 18 71	SUN	99																	
JUL 19 71	MON	6	151	52	26	9	35	65	9	143	79	40	29	43	54	26			
JUL 20 71	TUE	6	184	45	24	17	28	16	12	125	74	43	31	45	35	30			
JUL 21 71	WED	6	171	48	15	9	43		9	114	60	24	22	38	53	26	0.01	0.03	0.15
JUL 22 71	THU	6	163	87	17	12	33	10	13	109	68	23	28	38	29	27			
JUL 23 71	FRI	99																	
JUL 24 71	SAT	6	100	37	9	6	26	19	11	150	85	35	35	52	40	37			
JUL 25 71	SUN	99																	
JUL 26 71	MON	6	178	47	71	15	53	30	16	143	85	59	38	51	42	35			
JUL 27 71	TUE	6	123	55	94	28	37	30	20	140	79	78	47	45	32	31			
JUL 28 71	WED	6	398	35	120	22	34	46	21	133	80	74	45	50	44	33			
JUL 29 71	THU	6								116	74	43	48	38	28	24			
JUL 30 71	FRI	99																	
JUL 31 71	SAT	99																	
AUG 1 71	SUN	99																	
AUG 2 71	MON	6	200	62	47	48	40	36	15	99	69	43	61	32	31	24			
AUG 3 71	TUE	6	162	43	27	18	38	74	14	114	65	37	36	38	67	27			
AUG 4 71	WED	6	159	46	1	9	44	42	16	89	61	28	23	30	17	15	0.04	0.03	0.23
AUG 5 71	THU	6	122	30	26	14	37	26	27	105	67	42	38	43	43	32			
AUG 6 71	FRI	99																	
AUG 7 71	SAT	99																	
AUG 8 71	SUN	99																	
AUG 9 71	MON	6	184	75	33	25	51	23	12	170	92	45	43	57	47	31			
AUG 10 71	TUE	6	170	42	29	13	37	41	11	169	90	45	41	55	54	40			
AUG 11 71	WED	6	136	73	35	11	39	15	11	130	94	51	46	59	47	37	0.03	0.07	0.15
AUG 12 71	THU	6	120	46	26	25	40	31	16	141	59	34	36	49	43	29			
AUG 13 71	FRI	99																	
AUG 14 71	SAT	6	109	64	62	28	62	63	32	100	59	56	33	40	43	30			
AUG 15 71	SUN	99																	
AUG 16 71	MON	6	173	39	26	15	59	43	18	131	67	27	27	38	35	30			
AUG 17 71	TUE	6	141	46	21	15	23		13	85	55	27	25	39	27	27	0.02	0.03	0.20
AUG 18 71	WED	6								92	85	35	39	44	38	28			
AUG 19 71	THU	6	146	29	15	22	37	38	14	106	62	32	26	41	38	31	0.02	0.08	0.07
AUG 20 71	FRI	99																	
AUG 21 71	SAT	6	107	30	9	8	69	46		152	57	33	35	53	45				
AUG 22 71	SUN	99																	
AUG 23 71	MON	6	104	44	33	11	31	34	22	149	77	45	29	41	39	39			

Date Obsv	Day of Week	Sat Type	Tot SS	P-1 SS	S-1 SS	P-2 SS	S-2 SS	Tot C	P-1 C	P-1 Org	S-1 Org	P-2 Org	S-2 Org	Inf NO2	P-1 NO2	P-1 NO2
AUG 24 71	TUE	6	200	43	32	12	23	12	139	53	40	51	42	0.02	0.02	0.23
AUG 25 71	WED	6							122	23	27	37	29			
AUG 26 71	THU	6	139	37	14	12	30	17	145	31	33	52	35	0.02	0.02	0.18
AUG 27 71	FRI	99														
AUG 28 71	SAT	6	177	83	23	37	24	140	179	40	33	60	297	19		
AUG 29 71	SUN	99														
AUG 30 71	MON	6	140	69	48	23	92	18	167	113	53	68	41			
AUG 31 71	TUE	6	74	27	44	38	26	27	156	89	33	37	57	46	35	0.21
SEP 1 71	WED	6	115	43	40	19	48	37	22	196	70	32	28	50	40	37
SEP 2 71	THU	6	107	50	32	22	34	39	141	92	46	71	54	55	54	0.21
SEP 3 71	FRI	99														
SEP 4 71	SAT	99														
SEP 5 71	SUN	99														
SEP 6 71	MON	99														
SEP 7 71	TUE	6	141	37	25	18	40	40	131	50	40	37	74	25	55	0.42
SEP 8 71	WED	6						40	153	66	36	39	93	54	107	0.42
SEP 9 71	THU	6						116	216	71	55	48	109	46	46	0.17
SEP 10 71	FRI	99						149	149	60	63	44	75	88	71	
SEP 11 71	SAT	6	146	55	73	26	45	90	149	60	63	44	75	88	71	
SEP 12 71	SUN	99														
SEP 13 71	MON	6	156	75	90	81	61	65	28	134	69	113	67	36		
SEP 14 71	TUE	99														
SEP 15 71	WED	6	117	47	77	46	45	53	32	153	64	62	55	101	68	49
SEP 16 71	THU	6	185	40	41	26	33	14	24	130	76	58	48	50	46	51
SEP 17 71	FRI	99														
SEP 18 71	SAT	6	171	28	23	18	39	81	28	125	55	38	35	84	72	41
SEP 19 71	SUN	99														
SEP 20 71	MON	6	182	57	72	29	67	52	33	199	70	60	46	111	52	47
SEP 21 71	TUE	6	115	57	38	24	49	41	26	116	63	44	37	83	42	42
SEP 22 71	WED	6	145	57	29	22	58	44	35	98	42	30	27	47	35	43
SEP 23 71	THU	6	158	31	60	18	72	31	107	37	46	31	59	39	0.02	0.06
SEP 24 71	FRI	99														
SEP 25 71	SAT	6	116	22	16	13	61	26	115	42	28	29	82	34		
SEP 26 71	SUN	99														
SEP 27 71	MON	6	132					119								
SEP 28 71	TUE	99														
SEP 29 71	WED	99														
SEP 30 71	THU	6	95	56	52	32	81	59	17	121	49	37	40	55	46	30
OCT 1 71	FRI	99														
OCT 2 71	SAT	6	93	37	20	20	33	21	27	85	34	23	50	29	26	
OCT 3 71	SUN	99														
OCT 4 71	MON	6	125	53	31	42	42	26	25	127	55	33	32	51	34	23
OCT 5 71	TUE	6	151	44	28	28	54	27	133	43	37	32	79	65	31	
OCT 6 71	WED	6	116	20	26	32	87	37	14	83	40	33	36	62	34	27
OCT 7 71	THU	99														
OCT 8 71	FRI	99														
OCT 9 71	SAT	99														
OCT 10 71	SUN	6	122	43	44	35	57	36	37	72	40	29	44	45	96	31
OCT 11 71	MON	6	46	30	81	49	49	20	139	46	37	36	41	29	24	
OCT 12 71	TUE	6	96	44	88	26	63	53	46	101	39	16	60	47	37	10
OCT 13 71	WED	6	72	41	37	37	63	22	128	42	47	35	66	40	14	
OCT 14 71	THU	6														
OCT 15 71	FRI	99							118	74	42	60	87	69	18	

Date of Obsv	Day of Week	Sat Type	Inf SS	P-1 SS	P-1 SS	S-1 SS	P-2 SS	P-2 SS	S-2 SS	Inf C	P-1 C	P-1 C	S-1 C	P-2 C	P-2 C	S-2 C	Inf MO2	P-1 MO2	P-1 MO2
OCT 16 71	SAT	6	161	38	25	22	93	40	30	112	81	32	38	88	32				
OCT 17 71	SUN	99																	
OCT 18 71	MON	6	116	48	30	38	80	51	26	143	62	46	55	89	52				
OCT 19 71	TUE	6	120	45		38	76		31	138	71	44	46	61	51				
OCT 20 71	WED	6	96	53	35	38	61	206	24	136	66	41	48	66	180				
OCT 21 71	THU	6	134	33		32	49		21	152	55	42	47	67	38				
OCT 22 71	FRI	99																	
OCT 23 71	SAT	6	98	25	23	20	57	21	26	55	31	22	43	35	24				
OCT 24 71	SUN	99																	
OCT 25 71	MON	99																	
OCT 26 71	TUE	99																	
OCT 27 71	WED	99																	
OCT 28 71	THU	99																	
OCT 29 71	FRI	99																	
OCT 30 71	SAT	99																	
OCT 31 71	SUN	99																	
NOV 1 71	MON	6	176	56	61	29	77	73	44	186	81	63	57	92	51				
NOV 2 71	TUE	6	177	50		39	75		34	142	89	91	55	70	68				
NOV 3 71	WED	6								183	79	75	65	90	72				
NOV 4 71	THU	99																	
NOV 5 71	FRI	99																	
NOV 6 71	SAT	99																	
NOV 7 71	SUN	99																	
NOV 8 71	MON	99																	
NOV 9 71	TUE	99																	
NOV 10 71	WED	6	154	47	72	44	86	105	36	201	86	84	71	89	99				
NOV 11 71	THU	6	171	65		52	79		68	144	81	65	66	88	48				
NOV 12 71	FRI	99																	
NOV 13 71	SAT	6	172	31	57	34	78	53	29	159	64	45	44	61	52				
NOV 14 71	SUN	99																	
NOV 15 71	MON	6	212	83	76	34	107	103	66	186	103	76	72	108	89				
NOV 16 71	TUE	6	246	52	54	37	107	66	44	186	80	73	67	90	76				
NOV 17 71	WED	6	155	55	35	32	117	56	35	217	91	70	63	122	75				
NOV 18 71	THU	6	204	33	55	35	79	50	20	145	82	75	53	87	64				
NOV 19 71	FRI	99																	
NOV 20 71	SAT	6	188	41	30	28	79	55	52	129	42	28	30	49	43				
NOV 21 71	SUN	99																	
NOV 22 71	MON	6	98	26	16	18	68	34	16	140	42	50	50	79	48				
NOV 23 71	TUE	6	123	39	26		81	68	35	121	62	43		70	73				
NOV 24 71	WED	99																	
NOV 25 71	THU	99																	
NOV 26 71	FRI	99																	
NOV 27 71	SAT	6	90	29	49	322	57	93	22	65	36	35	146	35	46				
NOV 28 71	SUN	99																	
NOV 29 71	MON	6	177	48	46	26	33	52	40	150	67	43	39	76	61				
NOV 30 71	TUE	15	165	39	40	27	91	45	45	144	66	34	31	85	39				
DEC 1 71	WED	15																	
DEC 2 71	THU	15	115	46	23	28	84	32	35	137	63	35	40	79	44				
DEC 3 71	FRI	99																	
DEC 4 71	SAT	15	215	39	34	21	80		33	143	64	41	38	78	47				
DEC 5 71	SUN	99																	
DEC 6 71	MON	15	170	54	30	23	79	57	44	178	79	42	40	79	61				
DEC 7 71	TUE	15	184	53	67	25	97	79	41	134	68	53	36	80	67				

Date Obs	Day of Week	Samp Type	Inf SS	P-1 SS	P-1 SS	S-1 SS	P-2 SS	P-2 SS	S-2 SS	Inf C	P-1 Org C	S-1 Org C	P-2 Org C	P-2 Org C	S-2 Org C	Inf MO2	P-1 MO2	P-1 MO2
DEC 8 71	WED	15	231	36	54	50	109	80	47	134	70	40	74	58	42	---	---	---
DEC 9 71	THU	15	195	95	187	34	98	104	49	154	76	42	89	81	52	---	---	---
DEC 10 71	FRI	99																
DEC 11 71	SAT	15	213	78	60	42	152	104		186	84	55	122	79				
DEC 12 71	SUN	99																
DEC 13 71	MON	15	233	88	95	68	124	112	54	198	80	78	109	79	49			
DEC 14 71	TUE	15	219	64	144	52	129	87	60	182	71	83	88	74	61			
DEC 15 71	WED	15	272	197	88	77	158	101	78	158	110	72	97	76	53			
DEC 16 71	THU	99																
DEC 17 71	FRI	15	150	51	53	35	106	51	26	151	68	52	82	58	51			
DEC 18 71	SAT	99																
DEC 19 71	SUN	99																
DEC 20 71	MON	15	137	47	42	29	93	73	45	111	53	47	90	55	46			
DEC 21 71	TUE	99																
DEC 22 71	WED	99																
DEC 23 71	THU	99																
DEC 24 71	FRI	99																
DEC 25 71	SAT	99																
DEC 26 71	SUN	99																
DEC 27 71	MON	99																
DEC 28 71	TUE	15	157	54	43	27	71	70	50	131	54	40	57	57	46			
DEC 29 71	WED	15	157	37	33	58	57	38	33	93	51	46	51	52	48			
DEC 30 71	THU	15	154	49	28	23	82	55	49	186	75	45	78	52	49			
DEC 31 71	FRI	99																
JAN 1 72	SAT	99																
JAN 2 72	SUN	99																
JAN 3 72	MON	15	217	68	29	22	57	80	61	187	79	57	73	81	66			
JAN 4 72	TUE	15	199	44	45	22	52	27	23	140	68	49	76	84	43			
JAN 5 72	WED	15	175	45	31	22	62	25	25	86	56	47	45	44	43			
JAN 6 72	THU	15	225	59	29	126	85	10	41	152	66	53	74	85	53			
JAN 7 72	FRI	99																
JAN 8 72	SAT	15	76	42	46		44			82	46	60	68					
JAN 9 72	SUN	99																
JAN 10 72	MON	15	87	62	72	55	95	73	45	142	61	56	75	56	45			
JAN 11 72	TUE	15	74	31	32	31	32	29	15	77	49	33	49	48	36	0.01	0.05	
JAN 12 72	WED	15	215	102	377	235	369	134	114	119	86	55	46	73	51			
JAN 13 72	THU	99																
JAN 14 72	FRI	99																
JAN 15 72	SAT	15	113	65	40	71	97	30	115	98	63	67	62	35	53			
JAN 16 72	SUN	99																
JAN 17 72	MON	15	185	82	556	78	303	13	58	136	92	78	83	80	63			
JAN 18 72	TUE	15	178	55	93	24	58		66	155	72	54	40	72	76	0.02	0.03	0.12
JAN 19 72	WED	15	512	66	43	82	57	77	51	161	76	55	76	83	68			
JAN 20 72	THU	15	142	44	62	85	75	92	51	207	75	83	58	97	72	0.01	0.01	0.10
JAN 21 72	FRI	99																
JAN 22 72	SAT	15	120	46	44	18	54	91	34	119	63	52	63	69	53			
JAN 23 72	SUN	99																
JAN 24 72	MON	15	236	102	110	101	83	108	58	160	97	80	84	82	42			

Date of Obsv	Day of Week	Samp Type	S-1 MO2	P-2 MO2	P-2 MO2	Inf MO3	P-1 MO3	S-1 MO3	P-2 MO3	P-2 MO3	S-2 MO3	Inf MO3	P-1 MO3	S-1 MO3
NOV 19 69	WED	6												
NOV 19 69	WED	u												
NOV 20 69	THU	6												
NOV 20 69	THU	u												
NOV 21 69	FRI	6	0.05	0.05	0.05	0.05	0.15	0.05	0.05	0.05	0.05	0.05	28.3	27.0
NOV 21 69	FRI	u												
NOV 22 69	SAT	6	0.05	0.05	0.05	0.05	0.15	0.05	0.05	0.05	0.05	0.05	28.3	27.0
NOV 22 69	SAT	u												
NOV 23 69	SUN	6	0.05	0.05	0.05	0.05	0.15	0.05	0.05	0.05	0.05	0.05	28.3	27.0
NOV 23 69	SUN	u												
NOV 24 69	MON	6	0.07	0.05	0.05	0.05	0.15	0.03	0.05	0.10	0.05	0.05	26.2	25.6
NOV 24 69	MON	u												
NOV 25 69	TUE	6	0.07	0.05	0.05	0.05	0.15	0.03	0.05	0.10	0.05	0.05	26.2	25.6
NOV 25 69	TUE	u												
NOV 26 69	WED	6												
NOV 26 69	WED	u												
NOV 27 69	THU	6												
NOV 27 69	THU	u												
NOV 28 69	FRI	6	0.14	0.20	0.20	0.05	0.17	0.99	0.21	0.10	0.80	0.25	23.0	22.9
NOV 28 69	FRI	u												
NOV 29 69	SAT	6	0.14	0.20	0.20	0.05	0.17	0.99	0.21	0.10	0.80	0.25	23.0	22.9
NOV 29 69	SAT	u												
NOV 30 69	SUN	6	0.11	0.05	0.06	0.05	0.04	0.33	0.19	0.05	0.17	0.05	30.0	29.8
NOV 30 69	SUN	u												
DEC 1 69	MON	6	0.11	0.05	0.08	0.05	0.04	0.33	0.19	0.05	0.17	0.05	30.0	29.8
DEC 1 69	MON	u												
DEC 2 69	TUE	6	0.11	0.05	0.08	0.05	0.04	0.33	0.19	0.05	0.17	0.05	30.0	29.8
DEC 2 69	TUE	u												
DEC 3 69	WED	6	0.14	0.05	0.07	0.05	0.05	0.30	0.16	0.05	0.08	0.05	31.6	30.2
DEC 3 69	WED	u												
DEC 4 69	THU	6	0.14	0.05	0.07	0.05	0.05	0.30	0.16	0.05	0.08	0.05	31.6	30.2
DEC 4 69	THU	u												
DEC 5 69	FRI	6	0.06	0.05	0.05	0.05	0.05	0.21	0.04	0.05	0.05	0.01	26.2	25.9
DEC 5 69	FRI	u												
DEC 6 69	SAT	6	0.06	0.05	0.05	0.05	0.05	0.21	0.04	0.05	0.05	0.01	26.2	25.9
DEC 6 69	SAT	u												
DEC 7 69	SUN	6	0.06	0.05	0.05	0.05	0.05	0.21	0.04	0.05	0.05	0.01	26.2	25.9
DEC 7 69	SUN	u												
DEC 8 69	MON	6	0.15	0.05	0.08	0.05	0.05	0.40	0.60	0.05	0.27	0.29	24.8	20.7
DEC 8 69	MON	u												
DEC 9 69	TUE	6	0.15	0.05	0.08	0.05	0.05	0.40	0.60	0.05	0.27	0.29	24.8	20.7
DEC 9 69	TUE	u												
DEC 10 69	WED	6	0.18	0.05	0.06	0.05	0.05	0.21	0.57	0.05	0.19	0.19	23.0	22.6
DEC 10 69	WED	u												
DEC 11 69	THU	6	0.18	0.05	0.06	0.05	0.05	0.21	0.57	0.05	0.19	0.19	23.0	22.6
DEC 11 69	THU	u												
DEC 12 69	FRI	6	0.08	0.05	0.05	0.05	0.05	0.05	0.22	0.05	0.10	0.05	25.2	25.6
DEC 12 69	FRI	u												
DEC 13 69	SAT	6	0.08	0.05	0.05	0.05	0.05	0.05	0.22	0.05	0.10	0.05	25.2	25.6
DEC 13 69	SAT	u												
DEC 14 69	SUN	6	0.08	0.05	0.05	0.05	0.05	0.05	0.22	0.05	0.10	0.05	25.2	25.6
DEC 14 69	SUN	u												
DEC 15 69	MON	6												
DEC 15 69	MON	u												
DEC 16 69	TUE	6												
DEC 16 69	TUE	u												
DEC 17 69	WED	6												
DEC 17 69	WED	u												

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Date Obsv	Day of Week	Samp Type	S-1 NO2	P-2 NO2	S-2 NO2	Inf NO3	P-1 NO3	S-1 NO3	P-2 NO3	S-2 NO3	Inf NH3	P-1 NH3	S-1 PH3
DEC 18 69	THU	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.6	23.6	22.8
DEC 19 69	FRI	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.6	23.6	22.8
DEC 20 69	SAT		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	26.1	24.8
DEC 21 69	SUN		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 22 69	MON		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 23 69	TUE		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 24 69	WED		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 25 69	THU		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 26 69	FRI		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 27 69	SAT		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 28 69	SUN		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 29 69	MON	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 30 69	TUE	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
DEC 31 69	TUE	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 1 70	THU		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 2 70	FRI		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 3 70	SAT		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 4 70	SUN		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 5 70	MON		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 6 70	TUE		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 7 70	WED		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 8 70	THU		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 9 70	FRI		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 10 70	SAT		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 11 70	SUN		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 12 70	MON		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 13 70	TUE		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 14 70	WED		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 15 70	THU		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 16 70	FRI		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 17 70	SAT		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 18 70	SUN		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 19 70	MON	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 20 70	TUE	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 21 70	WED	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 22 70	THU	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 23 70	FRI	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 24 70	SAT	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 25 70	SUN	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 26 70	MON	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 27 70	TUE	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 28 70	WED	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 29 70	THU	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 30 70	FRI	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
JAN 31 70	SAT	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 1 70	SUN	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 2 70	MON	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 3 70	TUE	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 4 70	WED	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 5 70	THU	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 6 70	FRI	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 7 70	SAT	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4
FEB 8 70	SUN	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	21.4	21.4	21.4

Date of Obs	Day of Week	Samp Type	S-1 NO2	P-2 NO2	S-2 NO2	Inf NO1	P-1 NO3	F-1 NO3	S-1 NO3	P-2 NO3	S-2 NO3	Inf NH3	P-1 NH3	F-1 NH3	S-1 NH3
APR 3 70	FRI	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
APR 4 70	SAT	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
APR 5 70	SUN	7	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
APR 6 70	MON	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
APR 7 70	TUE	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
APR 8 70	WED	4	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
APR 9 70	THU	4													
APR 10 70	FRI	7													
APR 11 70	SAT	7													
APR 12 70	SUN	7													
APR 13 70	MON														
APR 14 70	TUE														
APR 15 70	WED	4		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 16 70	THU	4		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 17 70	FRI	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 18 70	SAT	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 19 70	SUN	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 20 70	MON			0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 21 70	TUE														
APR 22 70	WED														
APR 23 70	THU														
APR 24 70	FRI	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 25 70	SAT	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 26 70	SUN	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
APR 27 70	MON	4													
APR 28 70	TUE	4													
APR 29 70	WED	4													
APR 30 70	THU	4													
MAY 1 70	FRI	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
MAY 2 70	SAT	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
MAY 3 70	SUN	7		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
MAY 4 70	MON														
MAY 5 70	TUE														
MAY 6 70	WED	4		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
MAY 7 70	THU	4		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
MAY 8 70	FRI														
MAY 9 70	SAT														
MAY 10 70	SUN	6		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
MAY 11 70	MON														
MAY 12 70	TUE	6		0.30	0.30	0.30				0.30	0.30	22.0	20.0	20.0	19.0
MAY 13 70	WED														
MAY 14 70	THU														
MAY 15 70	FRI														
MAY 16 70	SAT														
MAY 17 70	SUN	6	0.30	0.30	0.30	0.30	0.30	0.10	0.30	0.30	0.30	22.0	20.0	20.0	19.0
MAY 18 70	MON														
MAY 19 70	TUE	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
MAY 20 70	WED														
MAY 21 70	THU	6	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	22.0	20.0	20.0	19.0
MAY 22 70	FRI														
MAY 23 70	SAT														
MAY 24 70	SUN	6	0.22	0.30	0.30	0.30	0.30	0.30	0.20	0.30	0.30	17.0	20.0	20.0	19.0
MAY 25 70	MON														

Date of Obsv	Day of Week	Temp Type	S-1 NO2	P-2 MO2	P-2 NO2	S-2 MO2	Inf MO3	P-1 NO3	S-1 MO3	P-2 MO3	P-2 NO3	S-2 NO3	Inf NO3	P-1 NO3	P-1 BH3	S-1 BH3
MAY 26 70	TUE	6	0.01	0.09	0.06	0.01	0.10	0.30	0.10	0.10	1.20	0.10	0.10	20.5	21.0	21.0
MAY 27 70	WED	6	0.01	0.04	0.09	0.01	0.10	0.50	0.30	0.10	0.10	0.10	19.5	24.0	25.0	25.5
MAY 28 70	THU	6	0.05	0.01	0.26	0.21	0.10	0.90	0.50	0.10	0.40	0.40	21.5	21.0	21.5	22.0
MAY 29 70	FRI	6	0.85	0.06	0.18	0.14	0.05	0.03	1.20	0.60	0.05	0.60	15.0	16.5	15.0	16.0
MAY 30 70	SAT	6	0.79	0.03	0.17	0.11	0.05	0.05	1.30	0.80	0.05	0.60	20.5	19.5	17.5	17.5
JUN 1 70	SUN	6	1.03	0.07	0.28	0.39	0.05	0.20	2.00	1.60	0.05	1.00	16.0	14.0	14.0	14.0
JUN 2 70	MON	6	0.90	0.10	0.20	0.20	0.30	0.10	1.70	1.10	0.10	0.70	23.5	18.0	17.0	16.5
JUN 3 70	TUE	9	0.60	0.10	0.10	0.10	0.20	0.10	1.10	0.80	0.10	0.10	23.5	16.0	15.0	15.0
JUN 4 70	WED	6	1.01	0.10	0.34	0.22	0.30	0.30	2.40	1.50	0.30	1.60	26.5	18.0	18.0	18.0
JUN 5 70	THU	6	0.55	0.10	0.12	0.10	0.10	0.10	1.30	0.50	0.10	0.80	25.5	21.0	21.0	21.0
JUN 6 70	FRI	6	0.53	0.02	0.13	0.15	0.20	0.10	1.90	1.00	1.00	0.40	18.0	17.5	16.5	17.5
JUN 7 70	SAT	6	0.04	0.02	0.77	0.28	0.10	0.10	3.40	2.80	0.10	1.10	17.0	12.0	10.5	11.0
JUN 8 70	SUN	6	0.65	0.05	0.15	0.25	0.10	0.10	2.00	1.30	0.10	0.90	23.5	18.0	15.5	15.0
JUN 9 70	MON	6	0.60	0.05	0.10	0.15	0.20	0.10	1.90	1.60	0.10	0.20	21.0	15.0	14.0	14.0
JUN 10 70	TUE	6	1.40	0.10	0.30	0.30	0.50	0.90	4.40	3.20	0.30	1.40	26.5	15.5	13.5	13.5
JUN 11 70	WED	6	1.00	0.05	0.20	0.15	0.20	0.40	4.10	4.00	0.10	0.50	23.0	11.0	9.0	9.0
JUN 12 70	THU	6	0.05	0.10	0.15	0.15	0.20	0.10	0.60	0.10	0.10	0.20	16.5	12.0	12.5	12.5
JUN 13 70	FRI	6	0.67	0.18	0.38	0.42	0.20	0.23	1.85	0.73	0.12	1.92	19.5	14.5	13.5	14.5
JUN 14 70	SAT	6	0.24	0.01	0.03	0.05	0.60	0.90	6.00	5.30	0.40	0.90	22.5	12.0	10.0	10.0
JUN 15 70	SUN	6	0.26	0.06	0.09	0.10	0.10	6.00	12.10	10.60	1.00	3.60	15.0	9.0	7.0	7.5
JUN 16 70	MON	6														
JUN 17 70	TUE	6														
JUN 18 70	WED	6														
JUN 19 70	THU	6														
JUN 20 70	FRI	6														
JUN 21 70	SAT	6														
JUN 22 70	SUN	6														
JUN 23 70	MON	6														
JUN 24 70	TUE	6														
JUN 25 70	WED	6														
JUN 26 70	THU	6														
JUN 27 70	FRI	6														
JUN 28 70	SAT	6														
JUN 29 70	SUN	6														
JUN 30 70	MON	6														
JUL 1 70	TUE	6														
JUL 2 70	WED	6														
JUL 3 70	THU	6														
JUL 4 70	FRI	6														
JUL 5 70	SAT	6														
JUL 6 70	SUN	6														
JUL 7 70	MON	6														
JUL 8 70	TUE	6														
JUL 9 70	WED	6														
JUL 10 70	THU	6														
JUL 11 70	FRI	6														
JUL 12 70	SAT	6														
JUL 13 70	SUN	6														
JUL 14 70	MON	6														
JUL 15 70	TUE	6														
JUL 16 70	WED	6														
JUL 17 70	THU	6														
JUL 18 70	FRI	6														

Date of Obsv	Day of Week	Sand Type	S-1 MO2	P-2 MO2	S-2 MO2	Inf MO1	P-1 MO3	S-1 MO1	P-2 MO3	S-2 MO3	Inf MH3	P-1 MH3	S-1 MH3
JUL 18 70	SAT												
JUL 19 70	SUN	6											
JUL 20 70	MON	6											
JUL 21 70	TUE												
JUL 22 70	TUE	6	0.04	0.17	0.42	0.20	0.10	0.20	0.10	1.00	26.5	21.5	20.5
JUL 23 70	THU												
JUL 24 70	THU												
JUL 25 70	FRI	6	0.64	0.75	0.67	0.20	0.10	1.30	0.70	4.20	19.0	14.0	13.5
JUL 26 70	SUN	6											
JUL 27 70	MON	6	0.04	0.01	0.05	0.10	0.10	0.40	0.10	0.10	36.5	25.0	22.5
JUL 28 70	TUE	6											
JUL 29 70	WED												
JUL 30 70	THU												
JUL 31 70	FRI												
AUG 1 70	SAT												
AUG 2 70	SUN												
AUG 3 70	MON												
AUG 4 70	TUE												
AUG 5 70	WED	6	0.25	0.05	0.25	0.10	0.10	0.90	0.40	1.90	25.0	21.0	20.0
AUG 6 70	THU	6											
AUG 7 70	FRI	6	0.25	0.05	0.45	0.10	0.10	0.80	0.10	2.50	23.0	20.0	19.5
AUG 8 70	SAT												
AUG 9 70	SUN	6											
AUG 10 70	MON	6											
AUG 11 70	TUE	6											
AUG 12 70	WED	6											
AUG 13 70	THU	6	0.39	0.01	0.29	0.09	0.09	0.47	0.11	1.21	19.5	19.5	18.0
AUG 14 70	FRI	6	0.89	0.03	0.38	0.09	0.09	1.81	1.31	3.02	18.5	17.0	16.5
AUG 15 70	SUN	6											
AUG 16 70	MON	6	0.34	0.01	0.60	0.09	0.09	0.68	1.16	0.40	27.5	19.0	16.0
AUG 17 70	TUE	11											
AUG 18 70	WED	6	0.40	0.03	0.27	0.44	0.20	1.60	1.30	1.70	23.5	18.5	17.5
AUG 19 70	THU												
AUG 20 70	FRI												
AUG 21 70	SAT												
AUG 22 70	SUN	6											
AUG 23 70	MON	6	0.32	0.05	0.42	0.20	0.10	2.40	2.10	3.60	23.5	15.0	13.0
AUG 24 70	TUE	6											
AUG 25 70	WED	6	0.27	0.11	0.33	0.40	0.30	1.90	1.70	1.20	22.5	17.5	17.0
AUG 26 70	THU	6											
AUG 27 70	FRI												
AUG 28 70	SAT												
AUG 29 70	SUN	6	0.41		0.90	0.30	0.70	3.30	3.00	3.90	17.0	15.0	15.0
AUG 30 70	MON	6											
AUG 31 70	TUE	6	0.40	0.06	0.40	0.40	0.10	2.40	2.20	2.20	21.0	15.5	14.0
SEP 1 70	WED	6	0.06	0.01	0.13	0.10	0.10	0.10	0.10	0.40	22.5	20.0	18.0
SEP 2 70	THU	6											
SEP 3 70	FRI	6											
SEP 4 70	SUN	6											
SEP 5 70	MON	6											
SEP 6 70	TUE	10	0.23	0.18	0.04	0.07	0.10	0.40	0.30	0.20	22.0	19.5	15.0
SEP 7 70	WED	6											
SEP 8 70	THU	6	0.23	0.18	0.04	0.07	0.10	0.40	0.30	0.20	22.0	19.5	15.0
SEP 9 70	FRI	10											
SEP 10 70	SAT	6											
SEP 11 70	SUN	10											

Date Obs	Day of Week	Samp Type	S-1 MO2	P-2 MO2	P-2 MO2	S-2 MO2	Inf MO3	P-1 MO3	S-1 MO3	P-2 MO3	P-2 MO3	S-2 MO3	Inf MO3	P-1 MO3	P-1 MO3	S-1 MO3
SEP 11 70	FRI															
SEP 12 70	SAT															
SEP 13 70	SUN	6	0.25	0.01	0.09	0.10	0.10	0.10	0.40	0.10	0.10	0.30	22.0	21.0	18.0	17.5
SEP 14 70	MON	6														
SEP 15 70	TUE	6	0.25	0.01	0.09		0.10	0.10	0.40	0.10	0.10	0.30	22.0	21.0	18.0	17.5
SEP 16 70	WED	6	0.25	0.01	0.09	0.10	0.10	0.10	0.40	0.10	0.10	0.30	22.0	21.0	18.0	17.5
SEP 17 70	THU	6														
SEP 18 70	FRI															
SEP 19 70	SAT															
SEP 20 70	SUN	6	0.07	0.01	0.04	0.02	0.10	0.10	0.30	0.10	0.10	0.10	23.5	22.0	22.5	22.0
SEP 21 70	MON	6														
SEP 22 70	TUE	6	0.07	0.01	0.04	0.02	0.10	0.10	0.30	0.10	0.10	0.10	23.5	22.0	22.5	22.0
SEP 23 70	WED	6	0.07	0.01	0.04	0.02	0.10	0.10	0.30	0.10	0.10	0.10	23.5	22.0	22.5	22.0
SEP 24 70	THU	6														
SEP 25 70	FRI															
SEP 26 70	SAT															
SEP 27 70	SUN	6	0.17	0.03	0.07	0.06	0.10	0.10	0.50	0.20	0.10	0.30	22.0	21.5	19.5	19.5
SEP 28 70	MON	6														
SEP 29 70	TUE	6	0.17	0.03	0.07	0.06	0.10	0.10	0.50	0.20	0.10	0.30	22.0	21.5	19.5	19.5
SEP 30 70	WED	6	0.17	0.03	0.07	0.06	0.10	0.10	0.50	0.20	0.10	0.30	22.0	21.5	19.5	19.5
OCT 1 70	THU	6														
OCT 2 70	FRI															
OCT 3 70	SAT															
OCT 4 70	SUN	4	0.37	0.05	0.05	0.06	0.40	0.40	1.20	0.60	0.10	0.10	29.0	21.0	21.5	21.0
OCT 5 70	MON	13														
OCT 6 70	TUE	6														
OCT 7 70	WED	6	0.37	0.05	0.05	0.06	0.40	0.40	1.20	0.60	0.10	0.10	29.0	21.0	21.5	21.0
OCT 8 70	THU	4														
OCT 9 70	FRI															
OCT 10 70	SAT															
OCT 11 70	SUN															
OCT 12 70	MON															
OCT 13 70	TUE															
OCT 14 70	WED															
OCT 15 70	THU															
OCT 16 70	FRI															
OCT 17 70	SAT															
OCT 18 70	SUN	6	0.48	0.40	0.25	0.16	0.20	0.90	2.50	2.40		0.60	25.5	19.0	19.0	18.5
OCT 19 70	MON	6														
OCT 20 70	TUE	12	0.48	0.40	0.25	0.16	0.20	0.90	2.50	2.40		0.60	25.5	19.0	19.0	18.5
OCT 21 70	WED	5														

Date Obsv	Day of Week	Samp Type	S-1 NO2	P-2 NO2	S-2 NO2	Inf NO3	P-1 NO3	S-1 NO3	P-2 NO3	S-2 NO3	Inf NO3	P-1 NO3	S-1 NO3
OCT 21 70	WED	6											
OCT 22 70	THU	12	0.43	0.40	0.16	0.20	0.90	2.50	2.40	0.40	25.5	19.0	18.5
OCT 23 70	FRI												
OCT 24 70	SAT												
OCT 25 70	SUN	13											
OCT 26 70	MON	12	0.41	0.04	0.12	0.10	0.20	2.30	1.90	0.10	28.5	22.0	20.5
OCT 27 70	TUE	6	0.41	0.04	0.12	0.10	0.20	2.30	1.90	0.10	28.5	22.0	20.5
OCT 28 70	WED	12	0.41	0.04	0.12	0.10	0.20	2.30	1.90	0.10	28.5	22.0	20.5
OCT 29 70	THU	6	0.41	0.04	0.12	0.10	0.20	2.30	1.90	0.10	28.5	22.0	20.5
OCT 30 70	FRI	12	0.41	0.04	0.12	0.10	0.20	2.30	1.90	0.10	28.5	22.0	20.5
OCT 31 70	SAT												
NOV 1 70	SUN	6	0.49	0.14	0.18	0.10	0.60	2.60	2.70	0.30	22.5	16.5	16.0
NOV 2 70	MON	10											
NOV 3 70	TUE	6											
NOV 4 70	WED												
NOV 5 70	THU	6	0.49	0.14	0.18	0.10	0.60	2.60	2.70	0.30	22.5	16.5	16.0
NOV 6 70	FRI	10											
NOV 7 70	SAT												
NOV 8 70	SUN	6	0.43	0.15	0.16	0.30	0.60	2.50	2.30	0.20	23.0	18.5	17.0
NOV 9 70	MON	10											
NOV 10 70	TUE	6	0.48	0.15	0.16	0.30	0.60	2.50	2.30	0.20	23.0	18.5	17.0
NOV 11 70	WED	10											
NOV 12 70	THU	6											
NOV 13 70	FRI												
NOV 14 70	SAT												
NOV 15 70	SUN												
NOV 16 70	MON												
NOV 17 70	TUE												
NOV 18 70	WED												
NOV 19 70	THU												
NOV 20 70	FRI												
NOV 21 70	SAT												
NOV 22 70	SUN												
NOV 23 70	MON	6	0.31	0.05	0.11	0.09	1.70	3.10	2.70	0.20	28.0	19.0	18.0
NOV 24 70	TUE												
NOV 25 70	THU												
NOV 26 70	FRI												
NOV 27 70	SAT												
NOV 28 70	SUN												
NOV 29 70	MON	6											
NOV 30 70	TUE	6											
DEC 1 70	WED	12	0.36	0.08	0.08	0.10	1.40	2.20	1.00	0.30	27.0	19.0	18.0
DEC 2 70	THU	6											
DEC 3 70	FRI	6											

Date of Obs	Day of Week	Sam Type	S-1 NO2	P-2 NO2	F-2 NO2	S-2 NO2	Inf NO3	P-1 NO3	S-1 NO3	P-2 NO3	P-2 NO3	S-2 NO3	Inf NO3	P-1 NH3	P-1 NH3	S-1 NH3
DEC 3 70	THU	12														
DEC 4 70	FRI	99														
DEC 5 70	SAT	99														
DEC 6 70	SUN	6														
DEC 7 70	SUN	12	0.59	0.10	0.08	0.09	0.10	1.40	5.30	0.30	0.30	0.10	23.0	12.5	11.0	16.5
DEC 8 70	TUE	6														
DEC 9 70	TUE	12	0.59	0.10	0.08	0.09	0.10	1.40	5.30	0.30	0.30	0.10	23.0	12.5	11.0	10.5
DEC 10 70	WED	6														
DEC 11 70	THU	12														
DEC 12 70	FRI	99														
DEC 13 70	SAT	99														
DEC 14 70	SUN	6														
DEC 15 70	TUE	6	0.57	0.08	0.02	0.03	0.10	1.70	3.60	0.10	0.10	0.10	23.5	15.5	12.5	13.5
DEC 16 70	WED	11	0.50	0.04	0.02	0.02	0.10	1.10	3.30	0.20	0.10	0.10	27.5	16.5	14.0	14.0
DEC 17 70	THU	6	0.46	0.06	0.02	0.03	0.05	0.50	2.20	0.10	0.10	0.10	22.0	14.5	12.5	13.0
DEC 18 70	THU	6	0.39	0.07	0.03	0.04	0.03	2.60	4.30	0.20	0.10	0.10	18.0	10.5	8.5	8.5
DEC 19 70	THU	6														
DEC 20 70	THU	99														
DEC 21 70	THU	99														
DEC 22 70	THU	99														
DEC 23 70	THU	99														
DEC 24 70	THU	99														
DEC 25 70	FRI	99														
DEC 26 70	SAT	99														
DEC 27 70	SUN	6	0.34	0.06	0.11	0.26	0.01	4.50	5.70	0.30	0.20	0.20	17.0	9.5	5.0	5.0
DEC 28 70	MON	6														
DEC 29 70	TUE	6	0.37	0.08	0.04	0.02		2.90	4.90	0.10	0.10	0.03	24.0	12.0	10.0	9.5
DEC 30 70	WED	6														
DEC 31 70	THU	99														
JAN 1 71	FRI	99														
JAN 2 71	SAT	99														
JAN 3 71	SUN	6	0.38	0.06	0.14	0.14	0.70	2.70	3.60	0.40	0.80	0.30	21.5	14.0	12.0	11.5
JAN 4 71	MON	6														
JAN 5 71	TUE	6	0.19	0.04	0.19	0.04	0.30	0.30	1.00	0.30	1.30	0.20	18.5	14.0	17.5	13.0
JAN 6 71	WED	6														
JAN 7 71	THU	6	0.31	0.06	0.03	0.03	0.20	0.70	1.90	0.10	0.20	0.10	28.5	17.5	16.0	16.0
JAN 8 71	FRI	99														
JAN 9 71	SAT	99														
JAN 10 71	SUN	6	0.29	0.10	0.06	0.06	0.10	1.00	2.00	0.20	0.10	0.10	20.0	17.5	15.5	15.0
JAN 11 71	MON	6														
JAN 12 71	TUE	6	0.07		0.02	0.02	0.20	0.10	0.10		0.10	0.10	20.0	19.5	18.5	19.0
JAN 13 71	WED	6														
JAN 14 71	THU	6	0.08	0.08	0.02	0.03	0.10	0.10	0.10	0.10	0.10	0.10	23.0	20.5	20.0	20.5
JAN 15 71	FRI	99														
JAN 16 71	SAT	99														
JAN 17 71	SUN	6	0.13	0.06	0.03	0.03	0.10	0.10	1.20	0.10	0.10	0.10	21.0	17.5	17.5	17.0
JAN 18 71	MON	6														
JAN 19 71	TUE	6	0.03	0.01	0.02	0.01	0.10	0.10	0.10	0.10	0.10	0.10	24.0	23.0	22.0	21.5
JAN 20 71	WED	6														
JAN 21 71	THU	6	0.02	0.01	0.07	0.02	0.10	0.10	0.10	0.10	0.10	0.10	24.0	22.0	21.5	21.5
JAN 22 71	FRI	99														
JAN 23 71	SAT	99														

Date of Obs	Day of Week	Sam Type	S-1 MO2	P-2 MO2	S-2 MO2	Inf MO3	P-1 MO3	S-1 MO3	P-2 MO3	S-2 MO3	Inf MO3	P-1 MO3	S-1 MO3
JAN 24 71	SUN	6	0.04	0.08	0.03	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
JAN 25 71	MON	6											
JAN 26 71	TUE	6	0.02	0.02	0.02	0.10	0.20	0.10	0.10	0.10	0.10	0.10	0.10
JAN 27 71	WED	5											
JAN 28 71	THU	6	0.02	0.04	0.02	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
JAN 29 71	FRI	99											
JAN 30 71	SAT	99											
JAN 31 71	SUN	98											
FEB 1 71	MON	6	0.02	0.02	0.02	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 2 71	TUE	6											
FEB 3 71	WED	6	0.01	0.01	0.02	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 4 71	THU	6											
FEB 5 71	FRI	99											
FEB 6 71	SAT	99											
FEB 7 71	SUN	6	0.10	0.10	0.13	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 8 71	MON	6											
FEB 9 71	TUE	6	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 10 71	WED	6											
FEB 11 71	THU	6	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 12 71	FRI	99											
FEB 13 71	SAT	99											
FEB 14 71	SUN	6	0.02	0.01	0.04	0.10	0.10	0.20	0.10	0.10	0.10	0.10	0.10
FEB 15 71	MON	6											
FEB 16 71	TUE	6	0.01	0.01	0.06	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 17 71	WED	6											
FEB 18 71	THU	6	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 19 71	FRI	99											
FEB 20 71	SAT	99											
FEB 21 71	SUN	6	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 22 71	MON	6											
FEB 23 71	TUE	6	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 24 71	WED	6											
FEB 25 71	THU	6	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
FEB 26 71	FRI	99											
FEB 27 71	SAT	99											
FEB 28 71	SUN	6	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
MAR 1 71	MON	6											
MAR 2 71	TUE	6	0.02	0.02	0.02	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
MAR 3 71	WED	6											
MAR 4 71	THU	99	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
MAR 5 71	FRI	99											
MAR 6 71	SAT	99											
MAR 7 71	SUN	6	0.02	0.04	0.03	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
MAR 8 71	MON	6											
MAR 9 71	TUE	6	0.01	0.01	0.01	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
MAR 10 71	WED	6											
MAR 11 71	THU	6											
MAR 12 71	FRI	99											
MAR 13 71	SAT	99											
MAR 14 71	SUN	6											
MAR 15 71	MON	6											
MAR 16 71	TUE	6											
MAR 17 71	WED	6											

Date Obsv	Day of Week	Swamp Type	S-1 MO2	P-2 MO2	S-2 MO2	Inf MO3	P-1 MO3	S-1 MO3	P-2 MO3	S-2 MO3	Inf MO3	P-1 MO3	S-1 MO3
MAR 18 71	THU	6											
MAR 19 71	FRI	99											
MAR 20 71	SAT	99											
MAR 21 71	SUN	6											
MAR 22 71	MON	6											
MAR 23 71	TUE	6	0.01	0.02	0.01	0.10	0.10	0.10	0.10	0.10	27.6	24.6	23.8
MAR 24 71	WED	6											
MAR 25 71	THU	6											
MAR 26 71	FRI	99											
MAR 27 71	SAT	99											
MAR 28 71	SUN	6											
MAR 29 71	MON	6											
MAR 30 71	TUE	6											
MAR 31 71	WED	6											
APR 1 71	THU	6											
APR 2 71	FRI	99											
APR 3 71	SAT	99											
APR 4 71	SUN	6											
APR 5 71	MON	6											
APR 6 71	TUE	6	0.10	0.01	0.12	0.10	0.10	0.10	0.10	0.10	21.0	19.5	20.5
APR 7 71	WED	6											
APR 8 71	THU	6											
APR 9 71	FRI	99											
APR 10 71	SAT	99											
APR 11 71	SUN	99											
APR 12 71	MON	6											
APR 13 71	TUE	6											
APR 14 71	WED	6											
APR 15 71	THU	6											
APR 16 71	FRI	99											
APR 17 71	SAT	99											
APR 18 71	SUN	6											
APR 19 71	MON	6											
APR 20 71	TUE	6											
APR 21 71	WED	6	0.01	0.03	0.02	0.10	0.10	0.10	0.10	0.10	32.0	28.5	29.5
APR 22 71	THU	6											
APR 23 71	FRI	99											
APR 24 71	SAT	99											
APR 25 71	SUN	6											
APR 26 71	MON	6											
APR 27 71	TUE	6											
APR 28 71	WED	6											
APR 29 71	THU	6											
APR 30 71	FRI	99											
MAY 1 71	SAT	99											
MAY 2 71	SUN	6											
MAY 3 71	MON	6											
MAY 4 71	TUE	6	0.01	0.01	0.01	0.20	0.20	0.10	0.20	0.10	25.5	27.0	28.5
MAY 5 71	WED	99											
MAY 6 71	THU	6											
MAY 7 71	FRI	99											
MAY 8 71	SAT	99											
MAY 9 71	SUN	6											

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Date of Obsv	Day of Week	Samp Type	S-1 MO2	P-2 MO2	P-2 MO2	S-2 MO2	Inf MO3	P-1 MO3	P-1 MO3	S-1 MO3	P-2 MO3	P-2 MO3	Inf MO3	P-1 MO3	P-1 MO3	S-1 MO3
MAY 10 71	MON	99														
MAY 11 71	TUE	99														
MAY 12 71	WED	99														
MAY 13 71	THU	99														
MAY 14 71	FRI	99														
MAY 15 71	SAT	99														
MAY 16 71	SUN	6														
MAY 17 71	MON	6														
MAY 18 71	TUE	6														
MAY 19 71	WED	99														
MAY 20 71	THU	6														
MAY 21 71	FRI	99														
MAY 22 71	SAT	99														
MAY 23 71	SUN	6														
MAY 24 71	MON	6														
MAY 25 71	TUE	6														
MAY 26 71	WED	6														
MAY 27 71	THU	6														
MAY 28 71	FRI	99														
MAY 29 71	SAT	99														
MAY 30 71	SUN	99														
MAY 31 71	MON	6														
JUN 1 71	TUE	6														
JUN 2 71	WED	6														
JUN 3 71	THU	6														
JUN 4 71	FRI	99														
JUN 5 71	SAT	99														
JUN 6 71	SUN	6														
JUN 7 71	MON	6														
JUN 8 71	TUE	6														
JUN 9 71	WED	6														
JUN 10 71	THU	6														
JUN 11 71	FRI	99														
JUN 12 71	SAT	99														
JUN 13 71	SUN	6														
JUN 14 71	MON	6														
JUN 15 71	TUE	6														
JUN 16 71	WED	6														
JUN 17 71	THU	99														
JUN 18 71	FRI	99														
JUN 19 71	SAT	99														
JUN 20 71	SUN	99														
JUN 21 71	MON	99														
JUN 22 71	TUE	6														
JUN 23 71	WED	99														
JUN 24 71	THU	6														
JUN 25 71	FRI	99														
JUN 26 71	SAT	0														
JUN 27 71	SUN	99														
JUN 28 71	MON	6														
JUN 29 71	TUE	6														
JUN 30 71	WED	6														
JUL 1 71	THU	6														

Date of Day	Day of Week	Samp Type	S-1 W02	P-2 W02	S-2 W02	Inf W03	P-1 W03	S-1 W03	P-2 W03	S-2 W03	Inf W03	P-1 W03	S-1 W03
JUL 2 71	FRI	99											
JUL 3 71	SAT	99											
JUL 4 71	SUN	99											
JUL 5 71	MON	6											
JUL 6 71	TUE	6											
JUL 7 71	WED	6											
JUL 8 71	THU	6											
JUL 9 71	FRI	99	0.17	0.05	0.13	0.07	0.20	0.40	0.60	0.40	1.90	0.20	13.5
JUL 10 71	SAT	6											
JUL 11 71	SUN	99											
JUL 12 71	MON	6											
JUL 13 71	TUE	6											
JUL 14 71	WED	6											
JUL 15 71	THU	6											
JUL 16 71	FRI	99	0.22	0.21	0.27	0.40	0.20	0.30	1.60	0.30	0.90	2.70	2.30
JUL 17 71	SAT	6											
JUL 18 71	SUN	99											
JUL 19 71	MON	6											
JUL 20 71	TUE	6											
JUL 21 71	WED	6											
JUL 22 71	THU	6											
JUL 23 71	FRI	99	0.17	0.08	0.23		0.10	0.10	0.10	0.10	0.10	0.10	30.0
JUL 24 71	SAT	6											
JUL 25 71	SUN	99											
JUL 26 71	MON	6											
JUL 27 71	TUE	6											
JUL 28 71	WED	6											
JUL 29 71	THU	6											
JUL 30 71	FRI	99											
JUL 31 71	SAT	99											
AUG 1 71	SUN	99											
AUG 2 71	MON	6											
AUG 3 71	TUE	6											
AUG 4 71	WED	6											
AUG 5 71	THU	6											
AUG 6 71	FRI	99	0.36	0.38	0.20	0.36	0.30	0.30	1.60	0.90	0.60	4.40	2.80
AUG 7 71	SAT	99											
AUG 8 71	SUN	99											
AUG 9 71	MON	6											
AUG 10 71	TUE	6											
AUG 11 71	WED	6											
AUG 12 71	THU	6											
AUG 13 71	FRI	99	0.23	0.40	0.25	0.42	0.10	0.10	2.80	1.60	1.00	8.20	3.60
AUG 14 71	SAT	6											
AUG 15 71	SUN	99											
AUG 16 71	MON	6											
AUG 17 71	TUE	6											
AUG 18 71	WED	6	0.16	0.12		0.31	0.20	0.10	3.10	7.60	1.10		5.70
AUG 19 71	THU	6											
AUG 20 71	FRI	99	0.20	0.46	0.29	0.45	0.20	0.10	1.80	2.30	1.10	6.50	5.00
AUG 21 71	SAT	6											
AUG 22 71	SUN	99											
AUG 23 71	MON	6											

Date of Obsv	Day of Week	Samp Type	S-1 MO2	P-2 MO2	S-2 MO2	Inf MO3	P-1 MO3	S-1 MO3	P-2 MO3	S-2 MO3	Inf MO3	P-1 MO3	S-1 MO3
AUG 28 71	TUE	6	0.24	0.75	0.39	0.20	0.10	4.00	1.70	5.00	14.5	15.5	11.0
AUG 29 71	TUE	6	0.22	0.10	0.12	0.20	0.20	2.00	0.50	2.00	19.5	19.5	15.0
AUG 30 71	TUE	6											
AUG 31 71	TUE	6	0.25	0.06	0.19	0.20	0.50	2.20	0.10	1.00	25.0	26.0	20.0
SEP 1 71	TUE	6	0.18	0.04	0.10	0.30	0.30	1.30	0.40	1.40	30.5	30.0	26.0
SEP 2 71	TUE	6											
SEP 3 71	FRI	99											
SEP 4 71	SAT	99											
SEP 5 71	SUN	99											
SEP 6 71	MON	99											
SEP 7 71	TUE	6	0.02	0.16	0.27	0.10	0.10	1.40	0.10	1.70	25.0	24.0	20.0
SEP 8 71	TUE	6	0.27	0.05	0.20	2.10	0.60	0.10	1.50	0.20	31.5	28.0	26.5
SEP 9 71	TUE	6											
SEP 10 71	FRI	99											
SEP 11 71	SAT	6											
SEP 12 71	SUN	99											
SEP 13 71	MON	6											
SEP 14 71	TUE	99											
SEP 15 71	TUE	6	0.24	0.03	0.13	0.30	0.20	2.00	0.50	1.20	19.0	17.0	14.0
SEP 16 71	TUE	6											
SEP 17 71	FRI	99											
SEP 18 71	SAT	6											
SEP 19 71	SUN	99											
SEP 20 71	MON	6											
SEP 21 71	TUE	6	0.25	0.03	0.11	0.10	0.20	0.70	1.50	0.20	19.5	17.5	15.0
SEP 22 71	TUE	6	0.43	0.04	0.20	0.10	0.10	0.50	1.20	0.20	22.5	21.0	19.5
SEP 23 71	TUE	6											
SEP 24 71	FRI	99											
SEP 25 71	SAT	6											
SEP 26 71	SUN	99											
SEP 27 71	MON	6											
SEP 28 71	TUE	99											
SEP 29 71	TUE	99											
SEP 30 71	TUE	6											
OCT 1 71	FRI	99											
OCT 2 71	SAT	6											
OCT 3 71	SUN	99											
OCT 4 71	MON	6											
OCT 5 71	TUE	6											
OCT 6 71	TUE	6											
OCT 7 71	TUE	99											
OCT 8 71	FRI	99											
OCT 9 71	SAT	99											
OCT 10 71	SUN	6											
OCT 11 71	MON	6											
OCT 12 71	TUE	6											
OCT 13 71	TUE	6											
OCT 14 71	TUE	6											
OCT 15 71	FRI	99											

Date of Obsv	Day of Week	Samp Type	S-1 MO2	P-2 MO2	S-2 MO2	Inf MO3	P-1 MO3	S-1 MO3	P-2 MO3	S-2 MO3	Inf MO3	P-1 MO3	S-1 MO3
OCT 16 71	SAT	6											
OCT 17 71	SUN	99											
OCT 18 71	MON	6											
OCT 19 71	TUE	6											
OCT 20 71	WED	6											
OCT 21 71	THU	6											
OCT 22 71	FRI	99											
OCT 23 71	SAT	6											
OCT 24 71	SUN	99											
OCT 25 71	MON	99											
OCT 26 71	TUE	99											
OCT 27 71	WED	99											
OCT 28 71	THU	99											
OCT 29 71	FRI	99											
OCT 30 71	SAT	99											
OCT 31 71	SUN	99											
NOV 1 71	MON	6											
NOV 2 71	TUE	6											
NOV 3 71	WED	99											
NOV 4 71	THU	99											
NOV 5 71	FRI	99											
NOV 6 71	SAT	99											
NOV 7 71	SUN	99											
NOV 8 71	MON	99											
NOV 9 71	TUE	99											
NOV 10 71	WED	6											
NOV 11 71	THU	6											
NOV 12 71	FRI	99											
NOV 13 71	SAT	6											
NOV 14 71	SUN	99											
NOV 15 71	MON	6											
NOV 16 71	TUE	6											
NOV 17 71	WED	6											
NOV 18 71	THU	6											
NOV 19 71	FRI	99											
NOV 20 71	SAT	6											
NOV 21 71	SUN	99											
NOV 22 71	MON	6											
NOV 23 71	TUE	6											
NOV 24 71	WED	99											
NOV 25 71	THU	99											
NOV 26 71	FRI	99											
NOV 27 71	SAT	6											
NOV 28 71	SUN	99											
NOV 29 71	MON	6											
NOV 30 71	TUE	15											
DEC 1 71	WED	15											
DEC 2 71	THU	15											
DEC 3 71	FRI	99											
DEC 4 71	SAT	15											
DEC 5 71	SUN	99											
DEC 6 71	MON	15											
DEC 7 71	TUE	15											

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Date of Obsv	Day of Week	Sam Type	S-1 NO2	P-2 NO2	S-2 NO2	Inf NO3	P-1 NO3	S-1 NO3	P-2 NO3	S-2 NO3	Inf NH3	P-1 NH3	S-1 NH3
DEC 8 71	WED	15											
DEC 9 71	THU	15											
DEC 10 71	FRI	99											
DEC 11 71	SAT	15											
DEC 12 71	SUN	99											
DEC 13 71	MON	15											
DEC 14 71	TUE	15											
DEC 15 71	WED	15											
DEC 16 71	THU	99											
DEC 17 71	FRI	99											
DEC 18 71	SAT	15											
DEC 19 71	SUN	99											
DEC 20 71	MON	15											
DEC 21 71	TUE	99											
DEC 22 71	WED	99											
DEC 23 71	THU	99											
DEC 24 71	FRI	99											
DEC 25 71	SAT	99											
DEC 26 71	SUN	99											
DEC 27 71	MON	99											
DEC 28 71	TUE	15											
DEC 29 71	WED	15											
DEC 30 71	THU	15											
DEC 31 71	FRI	99											
JAN 1 72	SAT	99											
JAN 2 72	SUN	99											
JAN 3 72	MON	15											
JAN 4 72	TUE	15											
JAN 5 72	WED	15											
JAN 6 72	THU	15											
JAN 7 72	FRI	99											
JAN 8 72	SAT	15											
JAN 9 72	SUN	99											
JAN 10 72	MON	15											
JAN 11 72	TUE	15											
JAN 12 72	WED	15											
JAN 13 72	THU	99											
JAN 14 72	FRI	99											
JAN 15 72	SAT	15											
JAN 16 72	SUN	99											
JAN 17 72	MON	15											
JAN 18 72	TUE	15											
JAN 19 72	WED	15											
JAN 20 72	THU	15											
JAN 21 72	FRI	99											
JAN 22 72	SAT	15											
JAN 23 72	SUN	99											
JAN 24 72	MON	15											

0.09 0.01 0.11 0.06 0.10 0.10 0.80 0.20 0.40 0.50 18.5 18.0 18.0

0.11 0.05 0.07 0.07 0.40 0.60 1.30 1.00 0.50 0.70 24.0 22.5 23.0

0.12 0.01 0.03 0.10 0.20 0.10 0.90 1.20 0.30 0.40 23.5 23.5 23.0

Date of Obsv	Day of Week	Stamp Type	P-2 M3	P-2 M3	S-2 M3	Inf KJLD M	P-1 KJLD M	S-1 KJLD M	P-2 KJLD M	S-2 KJLD M	Inf IM P	P-1 Totl IM P	S-1 Totl IM P	P-2 Totl IM P
NOV 19 69	WED	6												
NOV 19 69	WED	4												
NOV 20 69	THU	6												
NOV 20 69	THU	4												
NOV 21 69	FRI	6	26.2	27.9	26.4	42.0	37.8	37.5	37.8	35.0	35.9			
NOV 21 69	FRI	7												
NOV 22 69	SAT	4	26.2	27.9	26.4	42.0	37.8	37.5	37.8	35.0	35.9			
NOV 22 69	SAT	7												
NOV 23 69	SUN	4	26.2	27.9	26.4	42.0	37.8	37.8	37.8	35.0	35.9			
NOV 23 69	SUN	7												
NOV 24 69	MON	6	25.2	34.6	24.8	43.5	37.4	34.3	37.0	35.0	33.3			
NOV 24 69	MON	7												
NOV 25 69	TUE	6	25.2	24.6	24.8	43.5	37.4	34.3	37.0	35.0	33.3			
NOV 25 69	TUE	7												
NOV 26 69	WED	4												
NOV 26 69	WED	6												
NOV 27 69	THU	4												
NOV 27 69	THU	6												
NOV 28 69	FRI	4	22.2	21.6	22.0	42.6	33.3	31.0	32.0	29.8	29.0			
NOV 28 69	FRI	6	22.2	21.6	22.0	42.6	33.3	31.0	32.0	29.8	29.0			
NOV 29 69	SAT	4												
NOV 29 69	SAT	6												
NOV 30 69	SUN	4	28.6	28.8	28.6	47.3	41.0	38.3	41.0	36.7	35.7			
NOV 30 69	SUN	6												
DEC 1 69	MON	4	28.6	28.8	28.6	47.3	41.0	38.3	41.0	36.7	35.7			
DEC 1 69	MON	6												
DEC 2 69	TUE	4	28.6	28.8	28.6	47.3	41.0	38.3	41.0	36.7	35.7			
DEC 2 69	TUE	6												
DEC 3 69	WED	4	31.5	27.2	28.9	46.3	38.7	36.7	40.3	36.3	36.3			
DEC 3 69	WED	6												
DEC 4 69	THU	4	31.5	27.2	28.9	46.3	38.7	36.7	40.3	36.3	36.3			
DEC 4 69	THU	6												
DEC 5 69	FRI	4	25.0	25.0	24.8	41.0	36.3	33.0	36.3	33.0	32.0			
DEC 5 69	FRI	7												
DEC 6 69	SAT	4	25.0	25.0	24.8	41.0	36.3	33.0	36.3	33.0	32.0			
DEC 6 69	SAT	7												
DEC 7 69	SUN	4	25.0	25.0	24.8	41.0	36.3	33.0	36.3	33.0	32.0			
DEC 7 69	SUN	7												
DEC 8 69	MON	4	24.8	24.2	24.4	47.7	38.3	32.7	36.7	32.3	32.0			
DEC 8 69	MON	6												
DEC 9 69	TUE	4	24.8	24.2	24.4	47.8	38.3	32.7	36.7	32.3	32.0			
DEC 9 69	TUE	7												
DEC 10 69	WED	4	23.2	22.6	21.8	48.7	34.7	31.8	34.0	32.0				
DEC 10 69	WED	6												
DEC 11 69	THU	4	23.2	23.6	21.8	48.7	34.7	31.8	34.0	32.0				
DEC 11 69	THU	7												
DEC 12 69	FRI	4	25.1	25.0	25.0	36.7	32.0	28.3	31.0	30.0	29.7			
DEC 12 69	FRI	7												
DEC 13 69	SAT	4	25.1	25.0	25.0	36.7	32.0	28.3	31.0	30.0	29.7			
DEC 13 69	SAT	7												
DEC 14 69	SUN	4	25.1	25.0	25.0	36.7	32.0	28.3	31.0	30.0	29.7			
DEC 14 69	SUN	7												
DEC 15 69	MON	4												
DEC 15 69	MON	6												
DEC 16 69	TUE	4												
DEC 16 69	TUE	7												
DEC 17 69	WED	4												
DEC 17 69	WED	6												

Date of Obs	Day of Week	Samp Type	P-2 MH3	P-2	S-2 MH3	Inf KJLD	P-1 KJLD	P-1 M	S-1 KJLD	P-2 KJLD	P-2 M	S-2 KJLD	S-2 M	Inf Totl IMP	P-1 IMP	P-1 Totl IMP	S-1 IMP	P-2 Totl IMP	P-2 IMP
FEB 9 70	MON	4	23.8	23.6	23.2	41.0	36.0	33.6	33.6	36.0	35.0	33.6	33.6	9.2	9.5	9.8	9.7	9.7	9.7
FEB 10 70	TUE	4	23.8	23.6	23.2	41.0	36.0	33.6	33.6	36.0	35.0	33.6	33.6	9.2	9.5	9.8	9.7	9.7	9.7
FEB 11 70	WED	4	23.4	23.8	23.8	42.6	37.6	36.4	56.8	41.4	41.4	41.8	41.8	9.5	9.9	10.6	10.0	11.0	11.0
FEB 12 70	THU	4	23.4	23.8	23.8	42.6	37.6	36.4	56.8	41.4	41.4	41.8	41.8	9.5	9.9	10.6	10.0	11.0	11.0
FEB 13 70	FRI	7	22.4	22.8	22.0	42.6	40.8	41.6	38.8	41.6	39.6	37.6	37.6	9.5	10.8	10.8	10.7	11.7	11.7
FEB 14 70	SAT	7	22.4	22.8	22.0	42.6	40.8	41.6	38.8	41.6	39.6	37.6	37.6	9.5	10.8	10.8	10.7	11.7	11.7
FEB 15 70	SUN	7	22.4	22.8	22.0	42.6	40.8	41.6	38.8	41.6	39.6	37.6	37.6	9.5	10.8	10.8	10.7	11.7	11.7
FEB 16 70	MON	4	16.8	16.6	16.6	32.0	32.0	32.0	18.8	41.6	39.6	37.6	37.6	5.6	6.8	5.8	6.6	6.0	6.0
FEB 17 70	TUE	4	16.8	16.6	16.6	32.0	32.0	32.0	18.8	41.6	39.6	37.6	37.6	5.6	6.8	5.8	6.6	6.0	6.0
FEB 18 70	WED	4	17.8	17.2	17.2	30.2	28.2	27.2	26.0	28.0	26.6	25.8	25.8	6.9	7.0	8.1	6.7	7.8	7.8
FEB 19 70	THU	4	17.8	17.2	17.2	30.2	28.2	27.2	26.0	28.0	26.6	25.8	25.8	6.9	7.0	8.1	6.7	7.8	7.8
FEB 20 70	FRI	7	21.2	20.8	20.6	34.6	30.0	29.6	27.4	33.0	30.8	30.0	30.0	8.7	9.2	8.5	9.2	9.0	9.0
FEB 21 70	SAT	7	21.2	20.8	20.6	34.6	30.0	29.6	27.4	33.0	30.8	30.0	30.0	8.7	9.2	8.5	9.2	9.0	9.0
FEB 22 70	SUN	7	21.2	20.8	20.6	34.6	30.0	29.6	27.4	33.0	30.8	30.0	30.0	8.7	9.2	8.5	9.2	9.0	9.0
FEB 23 70	MON	4	20.8	21.2	21.6	38.6	36.6	35.4	35.4	36.6	36.2	35.2	35.2	10.3	10.0	11.0	9.8	10.5	10.5
FEB 24 70	TUE	4	20.8	21.2	21.6	38.6	36.6	35.4	35.4	36.6	36.2	35.2	35.2	10.3	10.0	11.0	9.8	10.5	10.5
FEB 25 70	WED	4	19.8	20.8	20.4	36.0	32.0	30.6	29.4	32.4	32.4	32.4	32.4	8.1	8.3	8.4	8.4	8.0	8.0
FEB 26 70	THU	4	19.8	20.8	20.4	36.0	32.0	30.6	29.4	32.4	32.4	32.4	32.4	8.1	8.3	8.4	8.4	8.0	8.0
FEB 27 70	FRI	4	19.8	20.8	20.4	36.0	32.0	30.6	29.4	32.4	32.4	32.4	32.4	8.1	8.3	8.4	8.4	8.0	8.0
FEB 28 70	SAT	4	19.8	20.8	20.4	36.0	32.0	30.6	29.4	32.4	32.4	32.4	32.4	8.1	8.3	8.4	8.4	8.0	8.0
MAR 1 70	SUN	4	22.8	22.2	22.8	46.2	39.4	39.8	39.8	40.4	39.0	39.2	39.2	8.2	9.6	10.5	10.7	10.9	10.9
MAR 2 70	MON	4	22.8	22.2	22.8	46.2	39.4	39.8	39.8	40.4	39.0	39.2	39.2	8.2	9.6	10.5	10.7	10.9	10.9
MAR 3 70	TUE	4	22.8	22.2	22.8	46.2	39.4	39.8	39.8	40.4	39.0	39.2	39.2	8.2	9.6	10.5	10.7	10.9	10.9
MAR 4 70	WED	4	18.0	17.8	17.0	37.2	34.0	32.0	32.0	31.6	31.0	29.6	29.6	7.3	7.3	7.7	7.9	6.6	6.6
MAR 5 70	THU	4	18.0	17.8	17.0	37.2	34.0	32.0	32.0	31.6	31.0	29.6	29.6	7.3	7.3	7.7	7.9	6.6	6.6
MAR 6 70	FRI	7	26.8	23.8	23.8	32.4	29.2	27.8	27.2	30.4	29.6	28.4	28.4	8.2	7.6	7.7	7.7	8.3	8.3
MAR 7 70	SAT	7	26.8	23.8	23.8	32.4	29.2	27.8	27.2	30.4	29.6	28.4	28.4	8.2	7.6	7.7	7.7	8.3	8.3
MAR 8 70	SUN	7	26.8	23.8	23.8	32.4	29.2	27.8	27.2	30.4	29.6	28.4	28.4	8.2	7.6	7.7	7.7	8.3	8.3
MAR 9 70	MON	4	22.6	24.6	21.4	41.4	38.0	36.2	16.0	37.0	39.0	37.2	37.2	9.4	9.4	9.3	10.1	8.9	8.9
MAR 10 70	TUE	4	22.6	24.6	21.4	41.4	38.0	36.2	16.0	37.0	39.0	37.2	37.2	9.4	9.4	9.3	10.1	8.9	8.9
MAR 11 70	WED	4	28.0	30.0	30.0	31.0	35.0	35.0	38.0	36.0	38.0	35.0	35.0	7.5	9.0	9.5	9.8	9.3	9.3
MAR 12 70	THU	4	28.0	30.0	30.0	31.0	35.0	35.0	38.0	36.0	38.0	35.0	35.0	7.5	9.0	9.5	9.8	9.3	9.3
MAR 13 70	FRI	4	22.6	22.6	21.4	42.0	38.0	36.0	28.0	33.4	33.0	30.0	30.0	7.7	8.4	8.5	8.3	8.8	8.8
MAR 14 70	SAT	4	22.6	22.6	21.4	42.0	38.0	36.0	28.0	33.4	33.0	30.0	30.0	7.7	8.4	8.5	8.3	8.8	8.8
MAR 15 70	SUN	4	22.6	22.6	21.4	42.0	38.0	36.0	28.0	33.4	33.0	30.0	30.0	7.7	8.4	8.5	8.3	8.8	8.8
MAR 16 70	MON	4	28.6	28.0	27.4	51.0	36.0	36.0	33.0	40.0	42.0	38.0	38.0	10.3	9.9	9.9	9.9	10.4	10.4
MAR 17 70	TUE	4	28.6	28.0	27.4	51.0	36.0	36.0	33.0	40.0	42.0	38.0	38.0	10.3	9.9	9.9	9.9	10.4	10.4
MAR 18 70	WED	4	28.6	28.6	28.6	38.0	36.0	41.0	35.0	40.0	38.0	36.0	36.0	8.5	9.6	10.3	9.8	9.4	9.4
MAR 19 70	THU	4	28.6	28.6	28.6	38.0	36.0	41.0	35.0	40.0	38.0	36.0	36.0	8.5	9.6	10.3	9.8	9.4	9.4
MAR 20 70	FRI	4	28.6	28.6	28.6	38.0	36.0	41.0	35.0	40.0	38.0	36.0	36.0	8.5	9.6	10.3	9.8	9.4	9.4
MAR 21 70	SAT	4	28.6	28.6	28.6	38.0	36.0	41.0	35.0	40.0	38.0	36.0	36.0	8.5	9.6	10.3	9.8	9.4	9.4
MAR 22 70	SUN	4	22.0	22.0	21.4	29.0	33.0	33.0	28.6	39.0	41.0	36.0	36.0	7.9	8.9	8.8	8.4	8.9	8.9
MAR 23 70	MON	4	22.0	22.0	21.4	29.0	33.0	33.0	28.6	39.0	41.0	36.0	36.0	7.9	8.9	8.8	8.4	8.9	8.9
MAR 24 70	TUE	4	22.0	22.0	21.4	29.0	33.0	33.0	28.6	39.0	41.0	36.0	36.0	7.9	8.9	8.8	8.4	8.9	8.9
MAR 25 70	WED	4	17.2	16.4	16.4	37.0	34.0	45.0	43.0	32.0	36.0	30.0	30.0	8.5	9.3	12.7	9.4	8.9	8.9
MAR 26 70	THU	4	17.2	16.4	16.4	37.0	34.0	45.0	43.0	32.0	36.0	30.0	30.0	8.5	9.3	12.7	9.4	8.9	8.9
MAR 27 70	FRI	4	17.2	16.4	16.4	37.0	34.0	45.0	43.0	32.0	36.0	30.0	30.0	8.5	9.3	12.7	9.4	8.9	8.9
MAR 28 70	SAT	4	17.2	16.4	16.4	37.0	34.0	45.0	43.0	32.0	36.0	30.0	30.0	8.5	9.3	12.7	9.4	8.9	8.9
MAR 29 70	SUN	4	17.2	16.4	16.4	37.0	34.0	45.0	43.0	32.0	36.0	30.0	30.0	8.5	9.3	12.7	9.4	8.9	8.9
MAR 30 70	MON	4	19.4	19.0	20.0	32.0	31.0	28.0	26.0	34.0	31.4	30.0	30.0	8.6	8.8	8.7	8.6	8.3	8.3
MAR 31 70	TUE	4	19.4	19.0	20.0	32.0	31.0	28.0	26.0	34.0	31.4	30.0	30.0	8.6	8.8	8.7	8.6	8.3	8.3
APR 1 70	WED	4	19.4	19.0	20.0	32.0	31.0	28.0	26.0	34.0	31.4	30.0	30.0	8.6	8.8	8.7	8.6	8.3	8.3
APR 2 70	THU	4	19.4	19.0	20.0	32.0	31.0	28.0	26.0	34.0	31.4	30.0	30.0	8.6	8.8	8.7	8.6	8.3	8.3

Date of Obsv	Day of Week	Send Type	P-2 NH3	P-2 NH3	S-2 NH3	Inf KJLD H	P-1 KJLD H	S-1 KJLD H	P-2 KJLD H	S-2 KJLD H	Inf Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
APR 3 70	FRI	7	21.4	22.0	22.0	36.0	39.0	28.0	31.0	32.0	7.8	8.5	8.6	8.4
APR 4 70	SAT	7	21.4	22.0	22.0	36.0	39.0	28.0	31.0	32.0	7.8	8.5	8.6	8.4
APR 5 70	SUN	7	21.4	22.0	22.0	36.0	39.0	28.0	31.0	32.0	7.8	8.5	8.6	8.4
APR 6 70	MON	4	24.0	23.0	23.0	37.0	35.0	35.4	36.0	39.0	8.7	9.7	10.4	9.6
APR 7 70	TUE	4	24.0	23.0	23.4	37.0	35.0	35.4	36.0	39.0	8.7	9.7	10.4	9.6
APR 8 70	WED	4												
APR 9 70	THU	4												
APR 10 70	FRI	7												
APR 11 70	SAT	7												
APR 12 70	SUN	7												
APR 13 70	MON													
APR 14 70	TUE													
APR 15 70	WED	4	23.5	23.0	23.0	35.5			34.5	32.0	7.6			7.8
APR 16 70	THU	4	23.5	23.0	23.0	35.5			34.5	32.0	7.6			7.8
APR 17 70	FRI	7	24.0	23.5	23.5	33.5			36.0	39.5	7.6			8.8
APR 18 70	SAT	7	24.0	23.5	23.5	33.5			36.0	39.5	7.6			8.8
APR 19 70	SUN	7	24.0	23.5	23.5	33.5			36.0	39.5	7.6			8.8
APR 20 70	MON													
APR 21 70	TUE													
APR 22 70	WED													
APR 23 70	THU	7	24.6	27.5	26.5	43.5			43.0	43.0	9.2			10.3
APR 24 70	FRI	7	24.6	27.5	26.5	43.5			43.0	43.0	9.2			10.3
APR 25 70	SAT	7	24.6	27.5	26.5	43.5			43.0	43.0	9.2			10.3
APR 26 70	SUN	7	24.6	27.5	26.5	43.5			43.0	43.0	9.2			10.3
APR 27 70	MON	4												
APR 28 70	TUE	4												
APR 29 70	WED	4												
APR 30 70	THU	4												
MAY 1 70	FRI	7	28.0	28.0	28.0	39.0			35.0	35.0	6.8			8.0
MAY 2 70	SAT	7	28.0	28.0	28.0	39.0			35.0	35.0	6.8			8.0
MAY 3 70	SUN	7	28.0	28.0	28.0	39.0			35.0	35.0	6.8			8.0
MAY 4 70	MON													
MAY 5 70	TUE	4	27.0	27.0	27.0	35.0			36.0	34.0	6.9			7.7
MAY 6 70	WED	4	27.0	27.0	27.0	35.0			36.0	34.0	6.9			7.7
MAY 7 70	THU	4												
MAY 8 70	FRI													
MAY 9 70	SAT	6	26.0	26.0	25.0	39.0			34.0	40.0	8.2			8.3
MAY 10 70	SUN	6	25.0	26.0	25.0	38.0			29.0	32.0	7.7			8.2
MAY 11 70	MON													
MAY 12 70	TUE	6												
MAY 13 70	WED	6												
MAY 14 70	THU													
MAY 15 70	FRI													
MAY 16 70	SAT	6	24.0	26.0	26.0	32.0	28.0	29.0	28.0	31.0	7.4	8.4	8.9	8.9
MAY 17 70	SUN	6												
MAY 18 70	MON													
MAY 19 70	TUE	6	23.0	23.0	23.0	32.5	31.0	30.0	29.5	28.0	8.8	9.0	9.8	10.0
MAY 20 70	WED	6	19.0	18.0	19.0	27.0	26.5	25.5	25.0	26.0	8.4	9.1	9.8	9.7
MAY 21 70	THU													
MAY 22 70	FRI													
MAY 23 70	SAT	6	20.0	20.0	19.0	29.0	25.5	24.0	25.0	23.5	8.1	9.2	8.7	9.4
MAY 24 70	SUN													
MAY 25 70	MON													

Date of Obsv	Day of Week	Sampl Type	P-2 NR3	P-2 NR3	Inf KJLD N	P-1 KJLD N	S-1 KJLD N	P-2 KJLD N	S-2 KJLD N	Inf Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
MAY 26 70	TUE	6	21.0	22.0	22.5	21.0	22.0	20.5	25.0	9.1	10.0	10.3	9.4
MAY 27 70	WED	6	21.5	22.0	27.5	26.0	26.5	23.0	22.5	10.5	11.0	11.1	11.3
MAY 28 70	THU	6	21.5	22.5	34.5	24.0	22.5	22.5	22.5	8.5	10.4	10.7	10.3
MAY 29 70	FRI	6	17.5	15.5	27.0	22.0	20.5	23.5	23.0	8.9	10.2	10.1	10.5
MAY 30 70	SAT	6	22.0	19.5	39.0	26.0	22.0	26.0	28.5	9.1	10.5	10.2	10.9
MAY 31 70	SUN	6	17.0	17.0	30.5	22.5	20.0	22.5	23.0	7.6	9.7	10.4	10.3
JUN 1 70	MON	6	23.0	19.5	28.5	23.5	20.0	16.5	22.5	9.3	10.6	10.2	10.4
JUN 2 70	TUE	9	19.0	18.5	37.5	21.5	19.5	16.0	25.0	10.0	9.4	9.6	9.7
JUN 3 70	WED	6	22.5	22.0	39.0	23.0	22.0	20.5	27.0	8.7	9.5	9.9	9.2
JUN 4 70	THU	6	24.0	23.0	38.0	26.5	24.0	24.0	27.0	8.5	9.7	10.6	10.4
JUN 5 70	FRI	6	19.0	18.5	28.5	23.5	22.5	21.0	27.5	8.3	9.4	10.2	9.2
JUN 6 70	SAT	6	13.5	14.0	28.5	17.5	16.4	15.5	21.0	7.4	8.5	9.3	9.0
JUN 7 70	SUN	6	21.0	18.5	38.5	28.5	21.0	19.0	23.5	9.6	8.6	8.4	9.0
JUN 8 70	MON	6	18.0	18.5	33.5	30.5	17.5	18.0	20.5	9.6	8.0	8.0	8.0
JUN 9 70	TUE	6	20.0	20.5	38.0	23.5	21.5	21.0	27.5	8.6	10.1	10.6	10.2
JUN 10 70	WED	6	18.5	17.0	34.0	18.5	15.5	15.0	23.0	9.4	10.0	10.3	10.5
JUN 11 70	THU	6	14.5	13.5	26.5	8.0	7.0	10.0	8.0	9.1	10.1	10.0	10.0
JUN 12 70	FRI	6	15.5	15.0	26.0	16.5	14.5	15.0	17.0	8.1	8.5	8.8	8.5
JUN 13 70	SAT	6	16.5	17.0	41.0	24.0	20.5	14.5	28.5	8.6	8.0	9.1	8.3
JUN 14 70	SUN	6	12.5	14.0	33.0	20.0	17.0	19.5	24.5	7.4	8.6	8.9	8.8
JUN 15 70	MON	6											
JUN 16 70	TUE	6											
JUN 17 70	WED	6											
JUN 18 70	THU	6											
JUN 19 70	FRI	6											
JUN 20 70	SAT	6											
JUN 21 70	SUN	6											
JUN 22 70	MON	6											
JUN 23 70	TUE	6											
JUN 24 70	WED	6											
JUN 25 70	THU	6											
JUN 26 70	FRI	6											
JUN 27 70	SAT	6											
JUN 28 70	SUN	6											
JUN 29 70	MON	6											
JUN 30 70	TUE	6											
JUL 1 70	WED	6											
JUL 2 70	THU	6											
JUL 3 70	FRI	6											
JUL 4 70	SAT	6											
JUL 5 70	SUN	6											
JUL 6 70	MON	6											
JUL 7 70	TUE	6											
JUL 8 70	WED	6											
JUL 9 70	THU	6											
JUL 10 70	FRI	6											
JUL 11 70	SAT	6											
JUL 12 70	SUN	6											
JUL 13 70	MON	6											
JUL 14 70	TUE	6											
JUL 15 70	WED	6											
JUL 16 70	THU	6											
JUL 17 70	FRI	6											

Date of Obsv	Day of Week	Samp Type	P-2 RH3	P-2 RH3	S-2 RH3	Inf KJLD H	P-1 KJLD H	S-1 KJLD H	P-2 KJLD H	S-2 KJLD H	Inf Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
JUL 18 70	SAT	6												
JUL 19 70	SUN	6												
JUL 20 70	MON	6												
JUL 21 70	TUE	6	16.0	15.0	18.5	42.0	32.0	28.5	26.0	23.0	8.0	8.8	8.8	8.8
JUL 22 70	TUE	6												
JUL 23 70	THU	6												
JUL 24 70	THU	6												
JUL 25 70	FRI	6	9.0	7.5	7.5	36.5	28.5	21.0	20.0	15.0	9.5	10.4	8.4	9.6
JUL 26 70	SUN	6												
JUL 27 70	MON	6	23.0	20.5	17.5	49.0	36.5	31.5	31.0	32.0	9.6	10.0	6.2	8.7
JUL 28 70	TUE	6												
JUL 29 70	WED	6												
JUL 30 70	THU	6												
JUL 31 70	FRI	6												
AUG 1 70	SAT	6												
AUG 2 70	SUN	6												
AUG 3 70	MON	6												
AUG 4 70	TUE	6												
AUG 5 70	WED	6	16.0	13.5	18.0	31.5	26.5	23.5	24.5	22.0	8.4	9.0	9.1	9.1
AUG 6 70	THU	6												
AUG 7 70	FRI	6	18.5			32.5	26.5		24.5	21.5	7.4	8.9	9.3	9.2
AUG 8 70	SAT	6												
AUG 9 70	SUN	6												
AUG 10 70	MON	6												
AUG 11 70	TUE	6												
AUG 12 70	WED	6	15.5		18.0	21.5	19.5	17.5	19.0	22.5	6.1	7.0	6.9	7.7
AUG 13 70	THU	6												
AUG 14 70	FRI	6	15.0		18.0	29.0	22.5	21.5	22.0	19.5	7.6	8.8	8.2	8.4
AUG 15 70	SUN	6												
AUG 16 70	MON	11	15.5	13.0	15.5	37.5	28.0	20.0	15.0	19.0	9.5	8.9	8.3	8.4
AUG 17 70	TUE	6												
AUG 18 70	WED	6	17.0	14.5	15.5	32.5	24.0	22.0	21.0	22.0	9.3	9.0	9.7	9.3
AUG 19 70	THU	6												
AUG 20 70	FRI	6												
AUG 21 70	SAT	6												
AUG 22 70	SUN	6												
AUG 23 70	MON	6	12.5	0.1	9.5	33.0	21.0	17.0	16.5	17.0	8.6	9.8	9.3	9.4
AUG 24 70	TUE	6												
AUG 25 70	WED	6	15.0	13.5	12.5	40.0	29.0	25.5	26.0	24.0	7.5	7.2	8.7	7.5
AUG 26 70	THU	6												
AUG 27 70	FRI	6												
AUG 28 70	SAT	6												
AUG 29 70	SUN	6	9.5	9.5	9.5	32.0	25.0	24.0	22.5	16.5	6.5	8.2	7.5	7.6
AUG 30 70	MON	6												
AUG 31 70	TUE	6	18.0	12.5	11.5	28.5	18.5	17.5	15.0	18.5	10.2	11.0	9.9	9.6
SEP 1 70	WED	6												
SEP 2 70	THU	6	18.0	16.5	16.0	28.0	23.0	23.5	20.0	21.5	10.1	8.6	10.5	9.4
SEP 3 70	FRI	6												
SEP 4 70	SUN	6												
SEP 5 70	MON	6												
SEP 6 70	TUE	10	17.5	18.0	19.0	26.0	23.0	18.0	14.5	19.0	8.9	9.0	10.1	9.0
SEP 7 70	WED	6												
SEP 8 70	THU	10	17.5	18.0	19.0	26.0	23.0	18.0	14.5	19.0	8.9	9.0	10.1	9.0
SEP 9 70	FRI	6												
SEP 10 70	SAT	6												
SEP 11 70	SUN	6												
SEP 12 70	MON	6												
SEP 13 70	TUE	6												
SEP 14 70	WED	6												
SEP 15 70	THU	6												
SEP 16 70	FRI	6												
SEP 17 70	SAT	6												
SEP 18 70	SUN	6												
SEP 19 70	MON	6												
SEP 20 70	TUE	6												
SEP 21 70	WED	6												
SEP 22 70	THU	6												
SEP 23 70	FRI	6												
SEP 24 70	SAT	6												
SEP 25 70	SUN	6												
SEP 26 70	MON	6												
SEP 27 70	TUE	6												
SEP 28 70	WED	6												
SEP 29 70	THU	6												
SEP 30 70	FRI	6												
SEP 31 70	SAT	6												

Day of Week	Date of Obs	Samp Type	P-2 MH3	P-2 MH3	S-2 BH3	Inf KJLD M	P-1 KJLD M	S-1 KJLD M	P-2 KJLD M	S-2 KJLD M	Inf Totl IMP	P-1 Totl IMP	S-1 Totl IMP	P-2 Totl IMP
SEP 11 70	FRI													
SEP 12 70	SAT													
SEP 13 70	SUN	6	27.5	19.0	18.0	27.5	22.5	19.0	24.0	20.0	9.0	9.5	9.9	10.2
SEP 14 70	MON	6												
SEP 15 70	TUE	6	20.5	19.0		27.5	22.5	19.0	24.0	20.0	9.0	9.5	9.9	10.2
SEP 16 70	WED	6												
SEP 17 70	THU	12	20.5	19.0	18.0	27.5	22.5	19.0	24.0	20.0	9.0	9.5	9.9	10.2
SEP 18 70	FRI	6												
SEP 19 70	SAT													
SEP 20 70	SUN	6	22.5	22.5	23.0	29.5	26.0	22.5	27.0	25.0	9.4	9.8	9.9	10.3
SEP 21 70	MON	6												
SEP 22 70	TUE	6	22.5	22.5	23.0	29.5	26.0	22.5	27.0	25.0	9.4	9.8	9.9	10.3
SEP 23 70	WED	6												
SEP 24 70	THU	12	22.5	22.5	23.0	29.5	26.0	22.5	27.0	25.0	9.4	9.8	9.9	10.3
SEP 25 70	FRI	6												
SEP 26 70	SAT													
SEP 27 70	SUN	6	21.5	21.0	21.0	36.0	31.0	21.0	24.5	21.5	8.4	8.5	9.6	8.3
SEP 28 70	MON	6												
SEP 29 70	TUE	6	21.5	21.0	21.0	36.0	31.0	21.0	24.5	21.5	8.4	8.5	9.6	8.3
SEP 30 70	WED	6												
OCT 1 70	THU	12	21.5	21.0	21.0	36.0	31.0	21.0	24.5	21.5	8.4	8.5	9.6	8.3
OCT 2 70	FRI	6												
OCT 3 70	SAT													
OCT 4 70	SUN	4	24.5	23.5	23.0	31.0	21.5	20.5	24.5	23.5	6.0	8.6	9.1	10.8
OCT 5 70	MON	13												
OCT 6 70	TUE	6												
OCT 7 70	WED	6	24.5	23.5	23.0	31.0	21.5	20.5	24.5	23.5	6.0	8.6	9.1	10.8
OCT 8 70	THU	4												
OCT 9 70	FRI													
OCT 10 70	SAT													
OCT 11 70	SUN													
OCT 12 70	MON													
OCT 13 70	TUE													
OCT 14 70	WED													
OCT 15 70	THU													
OCT 16 70	FRI													
OCT 17 70	SAT													
OCT 18 70	SUN	6	25.0	26.0	25.0	32.0	23.0	24.0	27.5	30.5	8.5	8.9	9.0	9.1
OCT 19 70	MON	6												
OCT 20 70	TUE	12	25.0	26.0	25.0	32.0	23.0	24.0	27.5	30.5	8.5	8.9	9.0	9.1
OCT 21 70	WED	6												

Date of Obsv	Day of Week	Samp Type	P-2 MH3	F-2 MH3	S-2 MH3	Inf KJLD M	P-1 KJLD M	P-1 KJLD W	S-1 KJLD M	P-2 KJLD M	F-2 KJLD M	Inf KJLD M	P-1 KJLD M	P-1 KJLD W	S-1 KJLD M	P-1 KJLD W	P-1 KJLD W	S-1 KJLD M	P-2 KJLD M
OCT 21 7C	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
OCT 22 7C	THU	6	25.0	26.0	25.0	32.0	23.0	24.0	22.0	27.5	30.5	26.5	8.5	8.9	9.1	9.1	9.1	9.0	9.1
OCT 23 7C	FRI	12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
OCT 24 7C	SAT	13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
OCT 25 7C	SUN	12	29.0	28.5	28.5	42.5	39.5	35.0	35.0	44.0	49.5	41.5	8.5	9.3	10.1	9.3	10.1	9.3	8.9
OCT 26 7C	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
OCT 27 7C	TUE	6	29.0	28.5	28.5	42.5	39.5	35.0	35.0	44.0	49.5	41.5	8.5	9.3	10.1	9.3	10.1	9.3	8.9
OCT 28 7C	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
OCT 29 7C	THU	6	29.0	28.5	28.5	42.5	39.5	35.0	35.0	44.0	49.5	41.5	8.5	9.3	10.1	9.3	10.1	9.3	8.9
OCT 30 7C	FRI	12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
OCT 31 7C	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 1 7C	SUN	6	19.5	21.0	21.5	42.0	26.5	25.0	19.5	27.5	27.0	27.5	6.1	7.4	8.4	6.0	5.8	6.0	5.8
NOV 2 7C	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 3 7C	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 4 7C	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 5 7C	THU	10	19.5	21.0	21.5	42.0	26.5	25.0	19.5	27.5	27.0	27.5	6.1	7.4	8.4	6.0	5.8	6.0	5.8
NOV 6 7C	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 7 7C	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 8 7C	SUN	6	24.0	24.5	25.5	29.0	23.0	21.5	21.0	28.0	26.0	27.0	6.9	7.7	8.3	8.5	7.5	8.5	7.5
NOV 9 7C	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 10 7C	TUE	6	24.0	24.5	25.5	29.0	23.0	21.5	21.0	28.0	26.0	27.0	6.9	7.7	8.3	8.5	7.5	8.5	7.5
NOV 11 7C	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 12 7C	THU	6	27.5	28.0	27.0	29.0	21.0	19.5	19.5	27.5	29.5	27.0	8.0	8.1	8.2	8.4	8.4	8.4	8.4
NOV 13 7C	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 14 7C	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 15 7C	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 16 7C	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 17 7C	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 18 7C	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 19 7C	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 20 7C	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 21 7C	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 22 7C	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 23 7C	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 24 7C	TUE	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 25 7C	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 26 7C	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 27 7C	FRI	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 28 7C	SAT	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 29 7C	SUN	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
NOV 30 7C	MON	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 1 7C	TUE	12	25.5	26.5	28.5	31.0	21.0	20.5	19.5	26.0	28.5	50.0	7.4	8.6	8.7	8.8	8.7	8.8	8.7
DEC 2 7C	WED	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
DEC 3 7C	THU	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Date of Obs	Day of Week	Seed Type	F-2 NH3	P-2 NH3	S-2 NH3	Inf KJLD N	P-1 KJLD N	P-1 KJLD N	S-1 KJLD N	P-2 KJLD N	S-2 KJLD N	Inf Totl IN P	P-1 Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
DEC 3 70	THU	12	25.5	28.5	28.5	31.0	21.0	20.5	19.5	26.0	50.0	7.0	8.6	8.7	8.8	8.7
DEC 4 70	FRI	99														
DEC 5 70	SAT	99														
DEC 6 70	SUN	6	23.5	26.5	25.5	39.0	23.5	21.0	17.5	32.0	32.0	9.0	9.4	9.7	10.1	9.8
DEC 7 70	MON	12														
DEC 8 70	TUE	99														
DEC 9 70	WED	6	23.5	26.5	25.5	39.0	23.5	21.0	17.5	32.0	32.0	9.0	9.4	9.7	10.1	9.8
DEC 10 70	THU	12														
DEC 11 70	FRI	99														
DEC 12 70	SAT	99														
DEC 13 70	SUN	6	24.0	25.5	23.0	38.0	22.0	17.5	20.5	37.5	40.0	7.3	9.1	9.6	10.3	8.0
DEC 14 70	MON	6	25.0	26.0	25.5	43.0	23.5	19.5	18.5	40.0	35.5	7.9	8.3	8.9	9.0	8.7
DEC 15 70	TUE	11														
DEC 16 70	WED	6	20.0	22.0	20.0	32.5	19.5	17.5	18.0	31.5	30.0	6.5	6.8	6.9	7.0	6.9
DEC 17 70	THU	6	20.5	23.0	22.0	33.0	15.5	13.0	13.0	30.5	31.0	6.7	7.4	7.5	8.5	7.8
DEC 18 70	FRI	6														
DEC 19 70	SAT	99														
DEC 20 70	SUN	6	19.0	20.0	20.5	27.0	13.5	9.5	9.0	25.5	29.0	5.1	6.8	6.9	6.5	5.4
DEC 21 70	MON	6	22.5	23.5	23.0	41.0	18.0	14.0	12.5	30.0	29.5	6.8	6.3	6.0	5.9	6.5
DEC 22 70	TUE	6														
DEC 23 70	WED	99														
DEC 24 70	THU	99														
DEC 25 70	FRI	99														
DEC 26 70	SAT	99														
DEC 27 70	SUN	6	19.0	20.0	20.5	27.0	13.5	9.5	9.0	25.5	29.0	5.1	6.8	6.9	6.5	5.4
DEC 28 70	MON	6	22.5	23.5	23.0	41.0	18.0	14.0	12.5	30.0	29.5	6.8	6.3	6.0	5.9	6.5
DEC 29 70	TUE	6														
DEC 30 70	WED	6														
DEC 31 70	THU	99														
JAN 1 71	FRI	99														
JAN 2 71	SAT	99														
JAN 3 71	SUN	6	22.0	22.0	22.5	24.5	14.0	14.0	12.0	27.5	22.0	6.7	7.5	7.5	7.3	7.2
JAN 4 71	MON	6	17.0	13.5	17.5	23.5	14.5	19.0	13.0	20.0	13.5	3.9	5.9	5.0	6.4	4.5
JAN 5 71	TUE	6	25.0	25.5	25.0	29.5	19.0	17.0	16.0	26.5	29.0	5.5	6.5	7.0	6.9	7.4
JAN 6 71	WED	6														
JAN 7 71	THU	6	22.5	23.0	23.5	20.5	19.0	16.0	15.0	24.5	23.0	5.2	7.0	6.9	6.8	6.3
JAN 8 71	FRI	99														
JAN 9 71	SAT	99														
JAN 10 71	SUN	6	22.5	23.0	23.5	20.5	19.0	16.0	15.0	24.5	23.0	5.2	7.0	6.9	6.8	6.3
JAN 11 71	MON	6														
JAN 12 71	TUE	6	20.0	20.0	20.0	28.0	25.5	22.0	22.0	23.5	24.0	6.1	7.0	7.2	7.4	
JAN 13 71	WED	6	22.5	23.0	23.0	31.5	26.0	22.5	24.0	26.5	28.0	7.2	8.1	8.2	8.1	8.3
JAN 14 71	THU	6														
JAN 15 71	FRI	99														
JAN 16 71	SAT	99														
JAN 17 71	SUN	6	21.0	21.5	21.5	29.0	21.0	18.5	19.5	27.0	26.0	6.4	7.8	8.1	8.4	7.2
JAN 18 71	MON	6	23.5	23.0	25.0	31.5	28.0	26.5	26.0	33.5	29.5	7.2	7.7	8.4	8.1	8.3
JAN 19 71	TUE	6														
JAN 20 71	WED	6	23.0	22.5	22.5	34.5	31.0	26.5	27.0	31.5	32.5	7.7	8.9	8.8	8.7	8.2
JAN 21 71	THU	6														
JAN 22 71	FRI	99														
JAN 23 71	SAT	99														

Date of Obsv	Day of Week	Samp Type	P-2 NH3	P-2 NH3	S-2 NH3	Inf EJLD W	P-1 EJLD W	P-1 KJLD W	S-1 KJLD W	P-2 KJLD W	F-2 KJLD W	S-2 KJLD W	Inf Totl IN P	P-1 Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
JAN 24 71	SUN	6	20.5	20.5	21.0	32.5	26.5	23.5	23.0	25.5	26.5	27.0	7.1	7.9	8.6	8.4	6.9
JAN 25 71	MON	6	20.5	21.5	21.0	30.0	26.0	23.5	25.0	27.5	28.5	26.0	6.9	7.6	7.9	7.8	7.7
JAN 26 71	TUE	6	21.0	26.5	27.0	30.5	26.0	23.5	23.5	29.0	27.0	28.0	7.1	7.9	8.3	8.4	8.2
JAN 27 71	WED	6															
JAN 28 71	THU	6															
JAN 29 71	FRI	99															
JAN 30 71	SAT	99															
JAN 31 71	SUN	99															
FEB 1 71	MON	6	27.0	26.5	29.0	32.5	29.5	28.0	28.0	35.0	32.5	32.5	8.2	8.2	8.5	8.4	7.9
FEB 2 71	TUE	6	22.5	23.5	23.5	27.0	30.0	29.5	26.5	25.5	29.5	26.0	5.4	6.8	7.7	6.8	6.3
FEB 3 71	WED	6															
FEB 4 71	THU	99															
FEB 5 71	FRI	99															
FEB 6 71	SAT	99															
FEB 7 71	SUN	6	18.0	19.0	19.0	18.5	21.0	18.5	19.0	24.0	24.5	21.5	3.4	5.3	5.1	5.3	4.5
FEB 8 71	MON	6	16.0	18.5	18.0	21.5	21.5	21.0	21.5	24.0	22.5	22.0	4.0	5.2	4.7	5.4	5.1
FEB 9 71	TUE	6	18.5	20.0	20.0	26.5	26.5	27.5	28.5	26.5	29.0	26.0	5.3	6.6	7.1	7.1	6.9
FEB 10 71	WED	6															
FEB 11 71	THU	6															
FEB 12 71	FRI	99															
FEB 13 71	SAT	99															
FEB 14 71	SUN	6	17.0	17.5	18.0	30.0	26.0	23.0	22.0	26.5	25.0	23.5	4.8	4.9	5.1	5.2	5.1
FEB 15 71	MON	6	19.5	19.5	19.5	31.0	29.0	30.5	30.0	31.0	27.5	27.0	5.7	6.5	7.1	7.2	7.2
FEB 16 71	TUE	6	21.0	22.0	22.0	26.5	25.5	26.5	26.0	27.0	28.0	27.0	7.1	7.7	7.7	7.8	7.6
FEB 17 71	WED	6															
FEB 18 71	THU	99															
FEB 19 71	FRI	99															
FEB 20 71	SAT	99															
FEB 21 71	SUN	6	24.0	24.5	24.5	33.5	33.5	33.5	32.5	34.5	32.0	33.0	6.0	8.3	8.0	8.3	8.1
FEB 22 71	MON	6	22.5	22.5	21.5	31.5	31.5	31.5	31.5	31.0	31.5	28.0	6.4	6.7	7.6	7.0	6.9
FEB 23 71	TUE	6	20.5	22.0	21.5	33.5	30.5	31.0	32.5	26.5	26.0	26.0	7.2	7.6	7.9	7.9	8.0
FEB 24 71	WED	99															
FEB 25 71	THU	99															
FEB 26 71	FRI	99															
FEB 27 71	SAT	99															
FEB 28 71	SUN	6	19.5	19.0	19.0	26.0	26.5	25.0	25.0	26.5	25.5	24.0	7.1	8.4	8.7	8.6	8.9
MAR 1 71	MON	6	18.5	19.0	19.0	27.5	25.5	26.5	27.0	28.0	27.0	24.5	8.2	7.5	7.6	7.8	7.8
MAR 2 71	TUE	6	15.5	15.5	14.5	22.5	21.0	21.5	20.5	21.0	20.0	21.0	5.3	5.4	5.4	5.3	5.8
MAR 3 71	WED	6															
MAR 4 71	THU	99															
MAR 5 71	FRI	99															
MAR 6 71	SAT	99															
MAR 7 71	SUN	6	16.5	18.4	18.8	26.0	26.5	26.0	26.0	26.0	25.5	24.0	3.9	4.8	5.2	5.2	4.9
MAR 8 71	MON	6	22.0	22.4	22.2	33.5	29.5	28.0	30.0	29.5	29.5	27.5	4.3	5.2	5.2	4.9	4.8
MAR 9 71	TUE	6															
MAR 10 71	WED	6															
MAR 11 71	THU	6															
MAR 12 71	FRI	99															
MAR 13 71	SAT	99															
MAR 14 71	SUN	6															
MAR 15 71	MON	6															
MAR 16 71	TUE	6															
MAR 17 71	WED	6															

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Date of Obsv	Day of Week	Temp Type	P-2 WH3	P-2 WH3	S-2 WH3	Inf KJLD N	P-1 KJLD N	P-1 KJLD N	S-1 KJLD N	P-2 KJLD N	S-2 KJLD N	Inf Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
MAR 18 71	THU	6													
MAR 19 71	FRI	99													
MAR 20 71	SAT	99													
MAR 21 71	SUN	6													
MAR 22 71	MON	6													
MAR 23 71	TUE	6	24.8	24.6	24.0	34.5	34.0	32.5	33.0	32.5	31.5	7.5	9.9	9.6	9.2
MAR 24 71	WED	6													
MAR 25 71	THU	6													
MAR 26 71	FRI	99													
MAR 27 71	SAT	99													
MAR 28 71	SUN	6													
MAR 29 71	MON	6													
MAR 30 71	TUE	6													
MAR 31 71	WED	6													
APR 1 71	THU	6													
APR 2 71	FRI	99													
APR 3 71	SAT	99													
APR 4 71	SUN	6													
APR 5 71	MON	6													
APR 6 71	TUE	6	19.5	19.0	20.5	26.0	25.5	24.5	24.0	24.5	23.5	6.0	6.6	6.4	6.6
APR 7 71	WED	6													
APR 8 71	THU	6													
APR 9 71	FRI	99													
APR 10 71	SAT	99													
APR 11 71	SUN	99													
APR 12 71	MON	6													
APR 13 71	TUE	6													
APR 14 71	WED	6													
APR 15 71	THU	6													
APR 16 71	FRI	99													
APR 17 71	SAT	99													
APR 18 71	SUN	6													
APR 19 71	MON	6													
APR 20 71	TUE	6													
APR 21 71	WED	6	29.0	31.0	30.0	36.5	32.5	31.5	31.5	30.5	35.0	7.7	8.3	8.2	8.2
APR 22 71	THU	6													
APR 23 71	FRI	99													
APR 24 71	SAT	99													
APR 25 71	SUN	6													
APR 26 71	MON	6													
APR 27 71	TUE	6													
APR 28 71	WED	6													
APR 29 71	THU	6													
APR 30 71	FRI	99													
MAY 1 71	SAT	99													
MAY 2 71	SUN	6													
MAY 3 71	MON	6													
MAY 4 71	TUE	6	27.5	26.5	27.5	30.0	28.0	28.5	29.5	28.0	27.5	5.8	7.5	7.6	7.0
MAY 5 71	WED	99													
MAY 6 71	THU	6													
MAY 7 71	FRI	99													
MAY 8 71	SAT	99													
MAY 9 71	SUN	6													

Date of Obsv	Day of Week	Samp Type	P-2 NH3	P-2 NH3	S-2 NH3	Inf KJLD M	P-1 KJLD M	P-1 KJLD M	Inf KJLD M	P-1 KJLD M	P-1 KJLD M	S-1 KJLD M	P-2 KJLD M	S-2 KJLD M	Inf KJLD M	P-1 Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
MAY 10 71	MON	99																	
MAY 11 71	TUE	99																	
MAY 12 71	WED	99																	
MAY 13 71	THU	99																	
MAY 14 71	FRI	99																	
MAY 15 71	SAT	99																	
MAY 16 71	SUN	6																	
MAY 17 71	MON	6																	
MAY 18 71	TUE	6																	
MAY 19 71	WED	99																	
MAY 20 71	THU	6																	
MAY 21 71	FRI	99																	
MAY 22 71	SAT	99																	
MAY 23 71	SUN	6																	
MAY 24 71	MON	6																	
MAY 25 71	TUE	6																	
MAY 26 71	WED	6																	
MAY 27 71	THU	6																	
MAY 28 71	FRI	99																	
MAY 29 71	SAT	99																	
MAY 30 71	SUN	99																	
MAY 31 71	MON	6																	
JUN 1 71	TUE	6																	
JUN 2 71	WED	6																	
JUN 3 71	THU	6																	
JUN 4 71	FRI	99																	
JUN 5 71	SAT	99																	
JUN 6 71	SUN	6																	
JUN 7 71	MON	6																	
JUN 8 71	TUE	6																	
JUN 9 71	WED	6																	
JUN 10 71	THU	6																	
JUN 11 71	FRI	99																	
JUN 12 71	SAT	99																	
JUN 13 71	SUN	6																	
JUN 14 71	MON	6																	
JUN 15 71	TUE	6																	
JUN 16 71	WED	6																	
JUN 17 71	THU	99																	
JUN 18 71	FRI	99																	
JUN 19 71	SAT	99																	
JUN 20 71	SUN	99																	
JUN 21 71	MON	99																	
JUN 22 71	TUE	6																	
JUN 23 71	WED	99																	
JUN 24 71	THU	6																	
JUN 25 71	FRI	99																	
JUN 26 71	SAT	6																	
JUN 27 71	SUN	99																	
JUN 28 71	MON	6																	
JUN 29 71	TUE	6																	
JUN 30 71	WED	6																	
JUN 31 71	THU	6																	

Date Obsv	Day of Week	Samp Type	P-2 NH3	P-2 NH3	S-2 NH3	Inf KJLD M	P-1 KJLD M	P-1 KJLD M	S-1 KJLD M	P-2 KJLD M	S-2 KJLD M	Inf Totl IN P	P-1 Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
JUL 2 71	FRI	99														
JUL 3 71	SAT	99														
JUL 4 71	SUN	99														
JUL 5 71	MON	6														
JUL 6 71	TUE	6														
JUL 7 71	WED	6														
JUL 8 71	THU	6	12.5	12.5	11.0	29.0	24.5	17.0	20.0	22.0	20.5	14.0	7.7	7.6	7.1	8.0
JUL 9 71	FRI	99														
JUL 10 71	SAT	6														
JUL 11 71	SUN	99														
JUL 12 71	MON	6														
JUL 13 71	TUE	6														
JUL 14 71	WED	6														
JUL 15 71	THU	6	13.0	12.0	11.5	26.5	24.5	21.0	19.0	17.5	16.0	14.5	8.0	8.9	8.8	8.7
JUL 16 71	FRI	99														
JUL 17 71	SAT	6														
JUL 18 71	SUN	99														
JUL 19 71	MON	6														
JUL 20 71	TUE	6														
JUL 21 71	WED	6														
JUL 22 71	THU	6	16.5	14.5	13.5	35.0	28.0	20.5	20.0	19.5	16.0	16.5	8.7	8.8	8.9	8.8
JUL 23 71	FRI	99														
JUL 24 71	SAT	6														
JUL 25 71	SUN	99														
JUL 26 71	MON	6														
JUL 27 71	TUE	6														
JUL 28 71	WED	6														
JUL 29 71	THU	6														
JUL 30 71	FRI	99														
JUL 31 71	SAT	99														
AUG 1 71	SUN	99														
AUG 2 71	MON	6														
AUG 3 71	TUE	6														
AUG 4 71	WED	6														
AUG 5 71	THU	6	15.0	12.5	12.5	26.5	21.5	19.0	19.0	15.5	13.0	14.0	7.1	7.0	7.0	7.3
AUG 6 71	FRI	99														
AUG 7 71	SAT	99														
AUG 8 71	SUN	99														
AUG 9 71	MON	6														
AUG 10 71	TUE	6														
AUG 11 71	WED	6														
AUG 12 71	THU	6	11.5	10.5	10.5	28.0	27.5	22.0	27.5	25.0	16.0	19.5	7.7	9.0	8.6	8.1
AUG 13 71	FRI	99														
AUG 14 71	SAT	6														
AUG 15 71	SUN	99														
AUG 16 71	MON	6														
AUG 17 71	TUE	6	16.0		13.0	24.0	22.5	19.0	18.5	16.0		13.5	5.7	7.0	7.5	7.7
AUG 18 71	WED	6														
AUG 19 71	THU	6	10.0	14.5	12.0	30.0	24.0	12.0	16.5	15.0	16.0	12.5	7.3	8.3	7.0	7.3
AUG 20 71	FRI	99														
AUG 21 71	SAT	6														
AUG 22 71	SUN	99														
AUG 23 71	MON	6														

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Date of Obs	Day of Week	Sam Type	P-2 BH3	P-2 BH3	S-2 BH3	Inf KJLD M	P-1 KJLD M	S-1 KJLD M	P-2 KJLD M	P-2 KJLD M	S-2 KJLD M	Inf Totl IUP	P-1 Totl IUP	S-1 Totl IUP	P-2 Totl IUP
AUG 26 71	TUE	6	9.0	8.5	7.5	21.5	20.0	13.5	11.5	12.5	11.5	7.3	7.5	7.9	7.5
AUG 25 71	WED	6	13.0	12.5	12.0	24.5	24.0	17.0	16.0	18.0	18.0	6.4	7.2	7.1	7.6
AUG 26 71	THU	6													
AUG 27 71	FRI	99													
AUG 28 71	SAT	6													
AUG 29 71	SUN	99													
AUG 30 71	MON	6	20.0	18.5	18.0	25.0	25.0	20.0	19.0	18.0	17.0	7.4	7.8	7.7	8.0
AUG 31 71	TUE	6	25.0	22.5	25.0	28.5	27.0	22.5	22.5	20.0	22.0	6.8	7.4	7.0	7.5
SEP 1 71	WED	6													
SEP 2 71	THU	99													
SEP 3 71	FRI	99													
SEP 4 71	SAT	99													
SEP 5 71	SUN	99													
SEP 6 71	MON	99	27.5	24.5	26.5	29.5	26.5	25.5	32.0	25.5	28.5	7.5	8.0	8.4	9.7
SEP 7 71	TUE	6	32.5		27.5	35.5	29.0	28.0	31.5		29.5	7.4	7.8	8.7	8.4
SEP 8 71	WED	6													
SEP 9 71	THU	6													
SEP 10 71	FRI	99													
SEP 11 71	SAT	6													
SEP 12 71	SUN	99													
SEP 13 71	MON	6													
SEP 14 71	TUE	99													
SEP 15 71	WED	6	21.5	18.5	17.0	26.5	25.5	21.5	29.5	24.5	25.0	6.2	7.6	7.2	7.7
SEP 16 71	THU	6													
SEP 17 71	FRI	99													
SEP 18 71	SAT	6													
SEP 19 71	SUN	99													
SEP 20 71	MON	6													
SEP 21 71	TUE	6	17.0	18.0	15.5	20.5	19.5	19.5	21.5	21.0	18.0	5.7	5.8	6.6	6.0
SEP 22 71	WED	6	22.5		21.5	28.0	23.0	22.5	25.5		23.5	6.8	7.1	7.2	7.2
SEP 23 71	THU	99													
SEP 24 71	FRI	99													
SEP 25 71	SAT	6													
SEP 26 71	SUN	99													
SEP 27 71	MON	6													
SEP 28 71	TUE	99													
SEP 29 71	WED	99													
SEP 30 71	THU	6													
OCT 1 71	FRI	99													
OCT 2 71	SAT	6													
OCT 3 71	SUN	99													
OCT 4 71	MON	6													
OCT 5 71	TUE	6													
OCT 6 71	WED	6													
OCT 7 71	THU	99													
OCT 8 71	FRI	99													
OCT 9 71	SAT	99													
OCT 10 71	SUN	6													
OCT 11 71	MON	6													
OCT 12 71	TUE	6													
OCT 13 71	WED	6													
OCT 14 71	THU	6													
OCT 15 71	FRI	99													

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Date of Obs	Day of Week	Stand Type	P-2 HR3	P-2 HR3	S-2 HR3	Inf KJLD N	P-1 KJLD N	P-1 KJLD N	S-1 KJLD N	P-2 KJLD N	S-2 KJLD N	Inf Totl IN P	P-1 Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P	
OCT 16 71	SAT	6															
OCT 17 71	SUN	99															
OCT 18 71	MON	6															
OCT 19 71	TUE	6															
OCT 20 71	WED	6															
OCT 21 71	THU	6															
OCT 22 71	FRI	99															
OCT 23 71	SAT	6															
OCT 24 71	SUN	99															
OCT 25 71	MON	99															
OCT 26 71	TUE	99															
OCT 27 71	WED	99															
OCT 28 71	THU	99															
OCT 29 71	FRI	99															
OCT 30 71	SAT	99															
OCT 31 71	SUN	99															
NOV 1 71	MON	6															
NOV 2 71	TUE	6															
NOV 3 71	WED	6															
NOV 4 71	THU	99															
NOV 5 71	FRI	99															
NOV 6 71	SAT	99															
NOV 7 71	SUN	99															
NOV 8 71	MON	99															
NOV 9 71	TUE	99															
NOV 10 71	WED	6															
NOV 11 71	THU	6															
NOV 12 71	FRI	99															
NOV 13 71	SAT	6															
NOV 14 71	SUN	99															
NOV 15 71	MON	6															
NOV 16 71	TUE	6															
NOV 17 71	WED	6															
NOV 18 71	THU	6															
NOV 19 71	FRI	99															
NOV 20 71	SAT	6															
NOV 21 71	SUN	99															
NOV 22 71	MON	6															
NOV 23 71	TUE	6															
NOV 24 71	WED	99															
NOV 25 71	THU	99															
NOV 26 71	FRI	99															
NOV 27 71	SAT	6															
NOV 28 71	SUN	99															
NOV 29 71	MON	6															
NOV 30 71	TUE	15															
DEC 1 71	WED	15															
DEC 2 71	THU	15															
DEC 3 71	FRI	99															
DEC 4 71	SAT	15															
DEC 5 71	SUN	99															
DEC 6 71	MON	15															
DEC 7 71	TUE	15															

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Date of Obs	Day of Week	Seap Type	P-2 NR3	P-2 NR3	S-2 NR3	Inf KJLD M	P-1 KJLD M	S-1 KJLD M	P-2 KJLD M	S-2 KJLD M	Inf Totl IN P	P-1 Totl IN P	S-1 Totl IN P	P-2 Totl IN P
DEC 8 71	WED	15												
DEC 9 71	THU	15												
DEC 10 71	FRI	99												
DEC 11 71	SAT	15												
DEC 12 71	SUN	99												
DEC 13 71	MON	15												
DEC 14 71	TUE	15												
DEC 15 71	WED	15												
DEC 16 71	THU	99												
DEC 17 71	FRI	15												
DEC 18 71	SAT	15												
DEC 19 71	SUN	99												
DEC 20 71	MON	15												
DEC 21 71	TUE	99												
DEC 22 71	WED	99												
DEC 23 71	THU	99												
DEC 24 71	FRI	99												
DEC 25 71	SAT	99												
DEC 26 71	SUN	99												
DEC 27 71	MON	99												
DEC 28 71	TUE	15												
DEC 29 71	WED	15												
DEC 30 71	THU	15												
DEC 31 71	FRI	99												
JAN 1 72	SAT	99												
JAN 2 72	SUN	99												
JAN 3 72	MON	15												
JAN 4 72	TUE	15												
JAN 5 72	WED	15												
JAN 6 72	THU	15												
JAN 7 72	FRI	99												
JAN 8 72	SAT	15												
JAN 9 72	SUN	99												
JAN 10 72	MON	15												
JAN 11 72	TUE	15												
JAN 12 72	WED	15												
JAN 13 72	THU	99												
JAN 14 72	FRI	99												
JAN 15 72	SAT	15												
JAN 16 72	SUN	99												
JAN 17 72	MON	15												
JAN 18 72	TUE	15												
JAN 19 72	WED	15												
JAN 20 72	THU	15												
JAN 21 72	FRI	99												
JAN 22 72	SAT	15												
JAN 23 72	SUN	99												
JAN 24 72	MON	15												

19.0 19.5 19.5 23.5 22.0 20.0 21.0 22.0 22.0 6.4 5.7 5.8 5.7

24.5 25.0 25.5 35.0 31.5 29.0 27.0 31.5 32.0 32.0 32.5 7.8 7.5 8.0

26.0 25.0 25.0 37.5 31.5 31.5 30.0 36.0 35.5 32.5 8.8 7.8 7.5 8.7

Date of Obsv	Day of week	Sampl Type	P-2 Totl W P	S-2 Totl IN P	Inf Totl P	P-1 Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	S-2 Totl P	Inf Turb	P-1 Turb	S-1 Turb	P-2 Turb	S-2 Turb
NOV 19 69	WED	6													
NOV 19 69	WED	4													
NOV 20 69	THU	6													
NOV 20 69	THU	4													
NOV 21 69	FRI	6													
NOV 21 69	FRI	7													
NOV 22 69	SAT	4													
NOV 22 69	SAT	7													
NOV 23 69	SUN	4													
NOV 23 69	SUN	7													
NOV 24 69	MON	6													
NOV 24 69	MON	4													
NOV 25 69	TUE	6													
NOV 25 69	TUE	8													
NOV 26 69	WED	4													
NOV 26 69	WED	6													
NOV 27 69	THU	4													
NOV 28 69	FRI	4													
NOV 29 69	SAT	4													
NOV 30 69	SUN	4													
DEC 1 69	MON	4													
DEC 1 69	MON	4													
DEC 2 69	TUE	4													
DEC 2 69	TUE	4													
DEC 3 69	WED	6													
DEC 3 69	WED	4													
DEC 4 69	THU	6													
DEC 4 69	THU	6													
DEC 5 69	FRI	6													
DEC 5 69	FRI	7													
DEC 6 69	SAT	4													
DEC 6 69	SAT	7													
DEC 7 69	SUN	4													
DEC 7 69	SUN	7													
DEC 8 69	MON	6													
DEC 8 69	MON	4													
DEC 9 69	TUE	6													
DEC 9 69	TUE	8													
DEC 10 69	WED	6													
DEC 10 69	WED	4													
DEC 11 69	THU	6													
DEC 11 69	THU	8													
DEC 12 69	FRI	7													
DEC 12 69	FRI	6													
DEC 13 69	SAT	4													
DEC 13 69	SAT	7													
DEC 14 69	SUN	4													
DEC 14 69	SUN	4													
DEC 15 69	MON	4													
DEC 15 69	MON	6													
DEC 16 69	TUE	6													
DEC 16 69	TUE	4													
DEC 17 69	WED	6													
DEC 17 69	WED	4													

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Date of Obsv	Day of Week	Seap Type	P-2 Totl IN P	S-2 Totl IN P	Inf Totl P	P-1 Totl P	S-1 Totl P	P-1 Turb	S-1 Turb	P-2 Turb	S-2 Turb
DEC 18 79	THU	6									
DEC 19 79	THU	6									
DEC 19 79	FRI										
DEC 20 79	SAT										
DEC 21 79	SUN										
DEC 22 79	MON										
DEC 23 79	TUE										
DEC 24 79	WED										
DEC 25 79	THU										
DEC 26 79	FRI										
DEC 27 79	SAT										
DEC 28 79	SUN										
DEC 29 79	MON										
DEC 30 79	TUE										
DEC 31 79	TUE										
JAN 1 80	THU										
JAN 2 80	FRI										
JAN 3 80	MON										
JAN 4 80	TUE										
JAN 5 80	WED										
JAN 6 80	THU										
JAN 7 80	FRI										
JAN 8 80	SAT										
JAN 9 80	SUN										
JAN 10 80	MON										
JAN 11 80	TUE										
JAN 12 80	WED										
JAN 13 80	THU										
JAN 14 80	FRI										
JAN 15 80	SAT										
JAN 16 80	SUN										
JAN 17 80	MON										
JAN 18 80	TUE										
JAN 19 80	WED										
JAN 20 80	THU										
JAN 21 80	FRI										
JAN 22 80	SAT										
JAN 23 80	SUN										
JAN 24 80	MON										
JAN 25 80	TUE										
JAN 26 80	WED										
JAN 27 80	THU										
JAN 28 80	FRI										
JAN 29 80	SAT										
JAN 30 80	SUN										
JAN 31 80	MON										
FEB 1 80	TUE										
FEB 2 80	WED										
FEB 3 80	THU										
FEB 4 80	FRI										
FEB 5 80	SAT										
FEB 6 80	SUN										
FEB 7 80	MON										
FEB 8 80	TUE										

Date Obsv	Day of week	Samp type	P-2 Totl IN P	S-2 Totl IN P	Inf Totl IN P	P-1 Totl P	S-1 Totl P	P-2 Totl P	S-2 Totl P	Inf Turb	P-1 Turb	S-1 Turb	P-2 Turb	S-2 Turb
MAY 26 70	TUE	-6	10.6	10.2	12.4	11.5	12.0	12.1	11.4	--	--	--	--	--
MAY 27 70	WED	6	11.1	10.9	13.1	12.4	13.2	11.8	11.6	--	--	--	--	--
MAY 28 70	THU	6	10.8	10.6	10.6	11.3	11.6	12.0	11.4	--	--	--	--	--
MAY 29 70	FRI	6	10.1	10.7	11.3	11.2	11.3	11.7	11.7	--	--	--	--	--
MAY 30 70	SAT	6	10.9	11.1	11.9	12.0	11.8	12.5	12.0	--	--	--	--	--
MAY 31 70	SUN	6	9.2	9.9	9.7	11.4	11.6	11.7	11.6	--	--	--	--	--
JUN 1 70	MON	6	10.3	10.5	12.2	11.9	12.6	13.0	13.0	--	--	--	--	--
JUN 2 70	TUE	6	8.9	8.9	14.0	12.3	12.3	12.6	12.4	--	--	--	--	--
JUN 3 70	WED	6	10.8	10.0	11.4	11.5	11.8	11.7	12.0	--	--	--	--	--
JUN 4 70	THU	6	10.0	10.7	11.4	11.3	11.8	11.6	11.4	--	--	--	--	--
JUN 5 70	FRI	6	9.9	9.9	10.3	10.2	10.9	10.6	10.3	--	--	--	--	--
JUN 6 70	SAT	6	8.7	9.0	9.5	9.6	10.0	9.6	9.6	--	--	--	--	--
JUN 7 70	SUN	6	8.7	8.8	12.6	10.2	10.2	10.8	10.0	--	--	--	--	--
JUN 8 70	MON	6	9.0	7.4	12.4	10.2	10.2	11.0	11.4	--	--	--	--	--
JUN 9 70	TUE	6	10.6	10.5	11.2	11.3	11.1	11.3	11.4	--	--	--	--	--
JUN 10 70	WED	6	10.6	10.3	11.1	10.9	10.8	10.7	11.0	--	--	--	--	--
JUN 11 70	THU	6	10.0	10.0	10.2	11.1	10.5	10.7	10.2	--	--	--	--	--
JUN 12 70	FRI	6	8.9	8.7	10.4	9.5	9.6	10.2	9.3	--	--	--	--	--
JUN 13 70	SAT	6	9.6	9.6	9.3	8.1	13.0	12.4	9.7	--	--	--	--	--
JUN 14 70	SUN	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 15 70	MON	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 16 70	TUE	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 17 70	WED	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 18 70	THU	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 19 70	FRI	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 20 70	SAT	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 21 70	SUN	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 22 70	MON	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 23 70	TUE	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 24 70	WED	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 25 70	THU	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 26 70	FRI	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 27 70	SAT	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 28 70	SUN	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 29 70	MON	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUN 30 70	TUE	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 1 70	WED	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 2 70	THU	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 3 70	FRI	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 4 70	SAT	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 5 70	SUN	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 6 70	MON	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 7 70	TUE	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 8 70	WED	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 9 70	THU	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 10 70	FRI	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 11 70	SAT	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 12 70	SUN	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 13 70	MON	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 14 70	TUE	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 15 70	WED	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 16 70	THU	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--
JUL 17 70	FRI	6	9.0	8.9	12.0	12.2	13.1	13.0	13.4	--	--	--	--	--

Date of Obs	Day of Week	Samp Type	P-2		S-2		Inf		P-1		S-1		P-2		S-2		P-1		S-1		P-2		S-2	
			Total	IN P	Total	IN P	Total	IN P	Total	IN P	Total	IN P	Total	IN P	Total	IN P	Total	IN P	Total	IN P	Total	IN P	Total	IN P
JUL 18 70	SAT																							
JUL 19 70	SUN	6																						
JUL 20 70	MON	6																						
JUL 21 70	TUE																							
JUL 22 70	WED																							
JUL 23 70	THU	6	10.1		8.3		10.7		10.2		10.1		10.2		10.0		10.2		10.1		10.2		10.1	
JUL 24 70	FRI																							
JUL 25 70	SAT																							
JUL 26 70	SUN	6	9.7		9.0		10.8		10.8		11.3		10.5		10.7		11.0		11.0		11.0		11.0	
JUL 27 70	MON	6																						
JUL 28 70	TUE	6	8.9		9.6				10.5		10.6		10.7		11.5		14.8		12.0					
JUL 29 70	WED																							
JUL 30 70	THU																							
JUL 31 70	FRI																							
AUG 1 70	SAT																							
AUG 2 70	SUN																							
AUG 3 70	MON																							
AUG 4 70	TUE																							
AUG 5 70	WED	6	8.4		9.0		10.4		10.1		10.0		9.8		10.0		9.5		9.5					
AUG 6 70	THU	6																						
AUG 7 70	FRI																							
AUG 8 70	SAT																							
AUG 9 70	SUN	6			9.6		9.5		10.0		10.1		10.1		10.1		10.4		10.4					
AUG 10 70	MON	6																						
AUG 11 70	TUE																							
AUG 12 70	WED	6																						
AUG 13 70	THU	6			8.3		9.9		10.5		10.3		10.2		10.3				9.4					
AUG 14 70	FRI																							
AUG 15 70	SAT	6			9.0		10.8		10.3		10.4		10.0		10.2				10.7					
AUG 16 70	SUN	6																						
AUG 17 70	MON	6																						
AUG 18 70	TUE	11	8.4		8.4		12.1		10.6		10.2		10.1		10.5		9.7		10.5					
AUG 19 70	WED																							
AUG 20 70	THU	6	8.9		9.4		11.2		10.9		10.7		10.6		10.7		10.7		10.3					
AUG 21 70	FRI																							
AUG 22 70	SAT																							
AUG 23 70	SUN																							
AUG 24 70	MON	6	8.7		9.2		10.5		10.5		10.3		10.1		10.4		10.0		10.0					
AUG 25 70	TUE	6																						
AUG 26 70	WED	6	9.3		8.7		9.4		9.9		9.8		10.0		10.2		11.5		9.8					
AUG 27 70	THU	6																						
AUG 28 70	FRI																							
AUG 29 70	SAT																							
AUG 30 70	SUN	6	9.5		9.5		9.2		9.9		10.0		10.1				10.4		10.1					
AUG 31 70	MON	6																						
SEP 1 70	TUE	6	10.4		10.4		11.7		11.0		10.9		10.6		11.1		11.4		10.6					
SEP 2 70	WED	6																						
SEP 3 70	THU	6	9.1		8.7		11.4		9.5		11.4		10.9		11.6		11.0		10.9					
SEP 4 70	FRI																							
SEP 5 70	SAT	6																						
SEP 6 70	SUN	6																						
SEP 7 70	MON	6																						
SEP 8 70	TUE	6																						
SEP 9 70	WED	10	9.1		9.5		12.1		11.3		11.3		11.6		10.8		11.2		11.8					
SEP 10 70	THU	6																						
SEP 11 70	FRI	10	9.1		9.5		12.1		11.3		11.3		11.6		10.8		11.2		11.8					

Date of Obsv	Day of Week	Sam Type	P-2 Totl Iv P	S-2 Totl Iv P	Inf Totl P	P-1 Totl P	P-1 Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	P-2 Totl P	Inf Totl P	P-1 Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	P-2 Totl P	S-2 Totl P
SEP 11 70	FRI																	
SEP 12 70	SAT																	
SEP 13 70	SUN	6	9.8	10.0	11.1	11.0	10.8	10.8	10.8	11.3	11.3	10.8						
SEP 14 70	MON	6																
SEP 15 70	TUE	6	9.8		11.1	11.0	10.8	10.8	10.8	11.3	11.3							
SEP 16 70	WED	6																
SEP 17 70	THU	12	9.8	10.0	11.1	11.0	10.8	10.8	10.8	11.3	11.3	10.8						
SEP 18 70	FRI	6																
SEP 19 70	SAT																	
SEP 20 70	SUN	6																
SEP 21 70	MON	12	8.5	8.6	11.0	10.7	11.7	11.0	11.0	11.4	11.5	11.1						
SEP 22 70	TUE	6																
SEP 23 70	TUE	12	8.5	8.6	11.0	10.7	11.7	11.0	11.0	11.4	11.5	11.1						
SEP 24 70	WED	6																
SEP 25 70	THU	12	8.5	8.6	11.0	10.7	11.7	11.0	11.0	11.4	11.5	11.1						
SEP 26 70	FRI	6																
SEP 27 70	SAT																	
SEP 28 70	SUN	6																
SEP 29 70	MON	12	8.0	9.6	10.6	10.3	10.2	10.1	10.1	10.7	10.3	10.2						
SEP 30 70	TUE	6																
SEP 31 70	WED	6	8.0	9.6	10.6	10.3	10.2	10.1	10.1	10.7	10.3	10.2						
OCT 1 70	THU	12																
OCT 2 70	FRI	6																
OCT 3 70	SAT																	
OCT 4 70	SUN	4	9.5	9.5	9.8	10.3	11.6	11.6	11.6	10.9	11.4	10.7						
OCT 5 70	MON	13																
OCT 6 70	TUE	6																
OCT 7 70	WED	6																
OCT 8 70	THU	4	9.5	9.5	9.8	10.3	11.6	11.6	11.6	10.9	11.4	10.7						
OCT 9 70	FRI																	
OCT 10 70	SAT																	
OCT 11 70	SUN																	
OCT 12 70	MON																	
OCT 13 70	TUE																	
OCT 14 70	WED																	
OCT 15 70	THU																	
OCT 16 70	FRI																	
OCT 17 70	SAT																	
OCT 18 70	SUN	6																
OCT 19 70	MON	12	10.2	9.2	10.3	9.8	9.9	10.1	10.1	10.4	11.7	10.3						
OCT 20 70	TUE	6																
OCT 21 70	WED	12	10.2	9.2	10.3	9.8	9.9	10.1	10.1	10.4	11.7	10.3						
OCT 22 70	THU	6																

Date of Obsv	Day of Week	Samp Type	F-2 Totl IN P	S-2 Totl IN P	Inf Totl P	P-1 Totl P	F-1 Totl P	S-1 Totl P	P-2 Totl P	F-2 Totl P	S-2 Totl P	Inf furb	P-1 furb	S-1 furb	P-2 furb	S-2 furb
OCT 21 70	WED	6														
OCT 22 70	THU	6	10.2	9.2	10.3	9.8	9.9	10.1	10.4	11.7	10.3					
OCT 23 70	FRI	12														
OCT 24 70	SAT															
OCT 25 70	SUN	13														
OCT 26 70	SUN	12	9.2	8.1	12.0	12.6	13.9	12.5	13.5	13.8	12.9					
OCT 27 70	TUE	6														
OCT 28 70	TUE	6	9.2	8.1	12.0	12.6	13.9	12.5	13.5	13.8	12.9					
OCT 29 70	WED	6														
OCT 30 70	THU	12	9.2	8.1	12.0	12.6	13.9	12.5	13.5	13.8	12.9					
OCT 31 70	FRI															
NOV 1 70	SAT	6														
NOV 2 70	SUN	10	5.8	5.7	10.2	9.3	9.5	9.1	8.0	9.9	9.4					
NOV 3 70	SUN	6														
NOV 4 70	MON	6														
NOV 5 70	TUE	6														
NOV 6 70	WED	10	5.8	5.7	10.2	9.3	9.5	9.1	8.0	9.9	9.4					
NOV 7 70	THU	6														
NOV 8 70	FRI	6														
NOV 9 70	SAT	10	7.9	8.2	11.6	11.4	11.8	11.3	10.7	10.9	11.1					
NOV 10 70	SUN	6														
NOV 11 70	TUE	6														
NOV 12 70	TUE	10	7.9	8.2	11.6	11.4	11.8	11.3	10.7	10.9	11.1					
NOV 13 70	WED	6														
NOV 14 70	THU															
NOV 15 70	FRI															
NOV 16 70	SAT															
NOV 17 70	SUN															
NOV 18 70	MON															
NOV 19 70	TUE															
NOV 20 70	WED															
NOV 21 70	THU															
NOV 22 70	FRI															
NOV 23 70	SAT	6	8.4	8.6	11.7	10.7	11.2	11.1	11.7	11.5	11.6					
NOV 24 70	SUN															
NOV 25 70	MON															
NOV 26 70	TUE															
NOV 27 70	WED															
NOV 28 70	THU															
NOV 29 70	FRI															
NOV 30 70	SAT	6														
NOV 31 70	SUN	6														
DEC 1 70	MON	6														
DEC 2 70	TUE	12	8.7	8.6	11.5	11.6	11.7	10.5	11.1	11.0	10.9					
DEC 3 70	WED	6														
DEC 4 70	THU	6														

Date of Obs	Day of Week	Samp Type	P-2 Totl IN P	S-2 Totl IN P	Inf Totl P	P-1 Totl P	P-1 Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	P-2 Totl P	Inf Turb	P-1 Turb	S-1 Turb	P-2 Turb	S-2 Turb
DEC 3 70	THU	12	8.7	8.6	11.5	11.6	11.7	10.5	11.1	11.0	10.9	--	--	--	--	--
DEC 4 70	FRI	99														
DEC 5 70	SAT	99														
DEC 6 70	SUN	6														
DEC 7 70	MON	12	9.4	9.6	12.9	12.2	12.3	12.5	12.9	12.5	12.7					
DEC 8 70	TUE	99														
DEC 9 70	TUE	12	9.4	9.6	12.9	12.2	12.3	12.5	12.9	12.5	12.7					
DEC 10 70	WED	6														
DEC 11 70	THU	12	9.4	9.6	12.9	12.2	12.3	12.5	12.9	12.5	12.7					
DEC 12 70	SAT	99														
DEC 13 70	SUN	6	8.1	8.8	11.0	12.1	12.3	12.4	11.4	10.7	11.8					
DEC 14 70	MON	6	8.0	9.0	11.9	11.8	11.4	11.5	12.3	11.5	11.9					
DEC 15 70	TUE	11	6.3	6.5	11.2	9.8	9.8	9.4	10.5	9.3	10.6					
DEC 16 70	WED	6	7.4	7.2	11.3	10.9	11.5	11.9	11.0	11.5	12.2					
DEC 17 70	THU	6														
DEC 18 70	FRI	99														
DEC 19 70	SAT	99														
DEC 20 70	SUN	6	5.6	6.7	9.8	10.0	9.8	9.4	9.2	9.4	9.8					
DEC 21 70	MON	6	6.5	6.4	11.1	10.6	9.8	9.9	11.1	10.6	10.5					
DEC 22 70	TUE	99														
DEC 23 70	WED	99														
DEC 24 70	THU	99														
DEC 25 70	FRI	99														
DEC 26 70	SAT	99														
DEC 27 70	SUN	6	5.6	6.7	9.8	10.0	9.8	9.4	9.2	9.4	9.8					
DEC 28 70	MON	6	6.5	6.4	11.1	10.6	9.8	9.9	11.1	10.6	10.5					
DEC 29 70	TUE	6														
DEC 30 70	WED	6														
DEC 31 70	THU	99														
JAN 1 71	FRI	99														
JAN 2 71	SAT	99														
JAN 3 71	SUN	6	8.0	8.0	11.2	10.7	10.6	10.3	10.9	10.7	10.9					
JAN 4 71	MON	6	6.1	4.8	7.5	8.1	7.6	9.2	6.4	9.1	7.2					
JAN 5 71	TUE	6														
JAN 6 71	WED	6	8.3	8.1	9.7	10.0	8.7	9.2	10.6	11.9	11.2					
JAN 7 71	THU	6														
JAN 8 71	FRI	99														
JAN 9 71	SAT	99														
JAN 10 71	SUN	6	6.5	7.0	10.0	9.8	10.1	8.7	9.4	10.6	10.9					
JAN 11 71	MON	6	7.7	7.6	8.8	8.8	8.7	8.8		8.8	8.8					
JAN 12 71	TUE	6	8.0	8.2	9.9	9.2	9.0	8.7	10.3	9.8	10.2					
JAN 13 71	WED	6														
JAN 14 71	THU	99														
JAN 15 71	FRI	99														
JAN 16 71	SAT	99														
JAN 17 71	SUN	6	7.6	7.7	12.2	13.5	13.1	13.3	13.6	13.4	12.6					
JAN 18 71	MON	6	8.0	8.4	15.0	14.1	13.7	13.3	13.5	13.6	12.6					
JAN 19 71	TUE	6														
JAN 20 71	WED	6	8.4	8.6	14.0	13.6	13.4	13.2	14.0	12.9	14.4					
JAN 21 71	THU	6														
JAN 22 71	FRI	99														
JAN 23 71	SAT	99														

Date of Obsv	Day of Week	Saap Type	P-2		Inf		P-1		S-1		P-2		S-1		P-2		S-2	
			Total	IN P	Total	P	Total	P	Total	P	Total	P	Total	P	Total	P	Total	P
JAN 26 71	SUN	6	7.5	7.5	13.6	13.9	12.7	13.1	12.3	12.6	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
JAN 25 71	MON	6	8.0	7.8	12.9	12.7	12.4	12.4	12.9	13.4	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
JAN 26 71	TUE	6	8.3	8.0	13.8	13.5	12.5	12.6	14.8	14.1	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
JAN 27 71	WED	6																
JAN 28 71	THU	6																
JAN 29 71	FRI	99																
JAN 30 71	SAT	99																
JAN 31 71	SUN	99																
FEB 1 71	MON	6	8.1	8.0	12.3	10.7	10.3	10.6	10.8	10.3	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
FEB 2 71	TUE	6	6.5	6.4	7.7	8.0	9.1	7.9	8.3	8.3	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
FEB 3 71	WED	6																
FEB 4 71	THU	6																
FEB 5 71	FRI	99																
FEB 6 71	SAT	99																
FEB 7 71	SUN	6	5.0	5.1	5.5	7.0	5.7	6.2	6.1	6.6	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
FEB 8 71	MON	6	6.3	5.9	6.8	7.2	6.4	7.2	7.5	7.3	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
FEB 9 71	TUE	6																
FEB 10 71	WED	6																
FEB 11 71	THU	6	7.8	7.6	8.4	8.9	9.2	9.1	8.3	9.6	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
FEB 12 71	FRI	99																
FEB 13 71	SAT	99																
FEB 14 71	SUN	6	5.5	5.5	9.0	8.1	7.1	6.8	7.6	7.5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
FEB 15 71	MON	6	7.4	7.3	8.3	8.7	9.2	9.1	9.7	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
FEB 16 71	TUE	6																
FEB 17 71	WED	6	8.0	7.7	9.7	9.7	9.9	9.7	10.2	10.3	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
FEB 18 71	THU	6																
FEB 19 71	FRI	99																
FEB 20 71	SAT	99																
FEB 21 71	SUN	6	8.1	8.7	10.5	11.5	10.9	11.0	11.0	10.6	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
FEB 22 71	MON	6	7.2	6.7	8.8	8.4	10.4	9.2	9.0	9.2	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
FEB 23 71	TUE	6																
FEB 24 71	WED	6	8.2	7.9	9.6	10.0	10.1	10.2	9.8	10.1	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
FEB 25 71	THU	6																
FEB 26 71	FRI	99																
FEB 27 71	SAT	99																
FEB 28 71	SUN	6	8.8	8.5	9.1	10.0	10.4	10.1	10.8	11.0	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
MAR 1 71	MON	6	8.0	8.1	9.7	8.8	9.1	8.8	9.2	9.3	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
MAR 2 71	TUE	6																
MAR 3 71	WED	6	5.2	5.2	7.1	6.9	6.5	6.2	7.2	6.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
MAR 4 71	THU	6																
MAR 5 71	FRI	99																
MAR 6 71	SAT	99																
MAR 7 71	SUN	6	4.7	4.5	7.9	8.8	8.6	8.6	9.0	9.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
MAR 8 71	MON	6	4.6	4.9	9.5	9.0	9.4	9.0	9.8	9.8	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
MAR 9 71	TUE	6																
MAR 10 71	WED	6																
MAR 11 71	THU	6																
MAR 12 71	FRI	99																
MAR 13 71	SAT	99																
MAR 14 71	SUN	6																
MAR 15 71	MON	6																
MAR 16 71	TUE	6																
MAR 17 71	WED	6																

Date of Obsv	Day of Week	Samp Type	F-2 Totl IP P	S-2 Totl IP P	Inf Totl P	P-1 Totl P	F-1 Totl P	S-1 Totl P	F-2 Totl P	S-2 Totl P	Inf Turb	P-1 Turb	S-1 Turb	F-2 Turb	S-2 Turb
MAR 18 71	THU	6													
MAR 19 71	FRI	99													
MAR 20 71	SAT	99													
MAR 21 71	SUN	6													
MAR 22 71	MON	6													
MAR 23 71	TUE	6													
MAR 24 71	WED	6													
MAR 25 71	THU	6													
MAR 26 71	FRI	99													
MAR 27 71	SAT	99													
MAR 28 71	SUN	6													
MAR 29 71	MON	6													
MAR 30 71	TUE	6													
MAR 31 71	WED	6													
APR 1 71	THU	6													
APR 2 71	FRI	99													
APR 3 71	SAT	99													
APR 4 71	SUN	6													
APR 5 71	MON	6													
APR 6 71	TUE	6													
APR 7 71	WED	6													
APR 8 71	THU	6													
APR 9 71	FRI	99													
APR 10 71	SAT	99													
APR 11 71	SUN	99													
APR 12 71	MON	6													
APR 13 71	TUE	6													
APR 14 71	WED	6													
APR 15 71	THU	6													
APR 16 71	FRI	99													
APR 17 71	SAT	99													
APR 18 71	SUN	6													
APR 19 71	MON	6													
APR 20 71	TUE	6													
APR 21 71	WED	6													
APR 22 71	THU	6													
APR 23 71	FRI	99													
APR 24 71	SAT	99													
APR 25 71	SUN	6													
APR 26 71	MON	6													
APR 27 71	TUE	6													
APR 28 71	WED	6													
APR 29 71	THU	6													
APR 30 71	FRI	99													
MAY 1 71	SAT	99													
MAY 2 71	SUN	6													
MAY 3 71	MON	6													
MAY 4 71	TUE	6													
MAY 5 71	WED	99													
MAY 6 71	THU	99													
MAY 7 71	FRI	99													
MAY 8 71	SAT	99													
MAY 9 71	SUN	6													

Date of Obs	Day of Week	Temp	P-2 Totl IN P	S-2 Totl IU P	Inf Totl P	P-1 Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	Inf Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	S-2 Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	S-2 Totl P
MAY 10 71	MON	99																
MAY 11 71	TUE	99																
MAY 12 71	WED	99																
MAY 13 71	THU	99																
MAY 14 71	FRI	99																
MAY 15 71	SAT	99																
MAY 16 71	SUN	6																
MAY 17 71	MON	6																
MAY 18 71	TUE	6																
MAY 19 71	WED	99																
MAY 20 71	THU	6																
MAY 21 71	FRI	99																
MAY 22 71	SAT	99																
MAY 23 71	SUN	6																
MAY 24 71	MON	6																
MAY 25 71	TUE	6																
MAY 26 71	WED	6																
MAY 27 71	THU	99																
MAY 28 71	FRI	99																
MAY 29 71	SAT	99																
MAY 30 71	SUN	6																
MAY 31 71	MON	6																
JUN 1 71	TUE	6																
JUN 2 71	WED	6																
JUN 3 71	THU	6																
JUN 4 71	FRI	99																
JUN 5 71	SAT	99																
JUN 6 71	SUN	6																
JUN 7 71	MON	6																
JUN 8 71	TUE	6																
JUN 9 71	WED	6																
JUN 10 71	THU	6																
JUN 11 71	FRI	99																
JUN 12 71	SAT	99																
JUN 13 71	SUN	6																
JUN 14 71	MON	6																
JUN 15 71	TUE	6																
JUN 16 71	WED	6																
JUN 17 71	THU	99																
JUN 18 71	FRI	99																
JUN 19 71	SAT	99																
JUN 20 71	SUN	99																
JUN 21 71	MON	99																
JUN 22 71	TUE	6																
JUN 23 71	WED	99																
JUN 24 71	THU	6																
JUN 25 71	FRI	99																
JUN 26 71	SAT	6																
JUN 27 71	SUN	99																
JUN 28 71	MON	6																
JUN 29 71	TUE	6																
JUN 30 71	WED	6																
JUL 1 71	THU	6																

Date of Obs	Day of Week	Sam Type	P-2 Totl IN P	S-2 Totl IN P	Inf Totl P	P-1 Totl P	P-1 S-1 Totl P	P-2 Totl P	P-2 S-2 Totl P	Inf Turb	P-1 Turb	P-2 Turb	P-2 S-2 Turb
JUL 2 71	FRI	99											
JUL 3 71	SAT	99											
JUL 4 71	SUN	99											
JUL 5 71	MON	6											
JUL 6 71	TUE	6											
JUL 7 71	WED	6											
JUL 8 71	THU	6											
JUL 9 71	FRI	99											
JUL 10 71	SAT	6											
JUL 11 71	SUN	99											
JUL 12 71	MON	6											
JUL 13 71	TUE	6											
JUL 14 71	WED	6											
JUL 15 71	THU	6											
JUL 16 71	FRI	99											
JUL 17 71	SAT	6											
JUL 18 71	SUN	99											
JUL 19 71	MON	6											
JUL 20 71	TUE	6											
JUL 21 71	WED	6											
JUL 22 71	THU	6											
JUL 23 71	FRI	99											
JUL 24 71	SAT	6											
JUL 25 71	SUN	99											
JUL 26 71	MON	6											
JUL 27 71	TUE	6											
JUL 28 71	WED	6											
JUL 29 71	THU	6											
JUL 30 71	FRI	99											
JUL 31 71	SAT	99											
AUG 1 71	SUN	99											
AUG 2 71	MON	6											
AUG 3 71	TUE	6											
AUG 4 71	WED	6											
AUG 5 71	THU	6											
AUG 6 71	FRI	99											
AUG 7 71	SAT	99											
AUG 8 71	SUN	99											
AUG 9 71	MON	6											
AUG 10 71	TUE	6											
AUG 11 71	WED	6											
AUG 12 71	THU	6											
AUG 13 71	FRI	99											
AUG 14 71	SAT	6											
AUG 15 71	SUN	99											
AUG 16 71	MON	6											
AUG 17 71	TUE	6											
AUG 18 71	WED	6											
AUG 19 71	THU	6											
AUG 20 71	FRI	99											
AUG 21 71	SAT	6											
AUG 22 71	SUN	99											
AUG 23 71	MON	6											

Date of Obs	Day of Week	Samp Type	P-2 Totl IN P	Inf Totl P	P-1 Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	P-2 Totl P	Inf Turb	P-1 Turb	S-1 Turb	P-2 Turb	S-2 Turb
AUG 28 71	TUE	6	8.1	9.1	8.9	8.6	8.6	8.1	8.2	8.6	8.3	9.7	8.1	8.5
AUG 29 71	TUE	6	8.3	7.8	8.9	8.6	8.6	8.1	8.3	9.7	8.1	8.1	8.1	8.1
AUG 30 71	TUE	6	7.9	7.1	9.2	9.9	9.4	8.8	9.7	9.4	8.8	8.8	8.8	8.8
AUG 31 71	TUE	6	7.2	6.9	9.9	9.7	9.1	9.1	9.2	9.2	9.9	9.9	9.9	9.9
SEP 1 71	TUE	6	4.6	9.0	10.3	10.0	10.0	10.0	10.6	10.4	9.8	9.8	9.8	9.8
SEP 2 71	TUE	6	8.5	9.7	10.7	11.2	10.3	10.9	10.9	10.9	9.8	9.8	9.8	9.8
SEP 3 71	TUE	6	7.6	8.1	9.3	9.4	9.0	8.7	9.4	9.4	9.8	9.8	9.8	9.8
SEP 4 71	TUE	6	6.7	6.2	8.2	7.8	8.2	7.8	7.6	7.6	8.2	8.2	8.2	8.2
SEP 5 71	TUE	6	7.3	9.0	8.4	8.2	8.2	8.5	9.4	9.4	8.8	8.8	8.8	8.8
SEP 6 71	TUE	6												
SEP 7 71	TUE	6												
SEP 8 71	TUE	6												
SEP 9 71	TUE	6												
SEP 10 71	TUE	6												
SEP 11 71	TUE	6												
SEP 12 71	TUE	6												
SEP 13 71	TUE	6												
SEP 14 71	TUE	6												
SEP 15 71	TUE	6												
SEP 16 71	TUE	6												
SEP 17 71	TUE	6												
SEP 18 71	TUE	6												
SEP 19 71	TUE	6												
SEP 20 71	TUE	6												
SEP 21 71	TUE	6												
SEP 22 71	TUE	6												
SEP 23 71	TUE	6												
SEP 24 71	TUE	6												
SEP 25 71	TUE	6												
SEP 26 71	TUE	6												
SEP 27 71	TUE	6												
SEP 28 71	TUE	6												
SEP 29 71	TUE	6												
SEP 30 71	TUE	6												
OCT 1 71	TUE	6												
OCT 2 71	TUE	6												
OCT 3 71	TUE	6												
OCT 4 71	TUE	6												
OCT 5 71	TUE	6												
OCT 6 71	TUE	6												
OCT 7 71	TUE	6												
OCT 8 71	TUE	6												
OCT 9 71	TUE	6												
OCT 10 71	TUE	6												
OCT 11 71	TUE	6												
OCT 12 71	TUE	6												
OCT 13 71	TUE	6												
OCT 14 71	TUE	6												
OCT 15 71	TUE	6												

Date of Obs	Day of Week	Samp Type	P-2 Totl IN P	S-2 Totl IN P	Inf Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	S-2 Totl P	Inf Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	S-2 Totl P
OCT 16 71	SAT	6												
OCT 17 71	SUN	99												
OCT 18 71	MON	6												
OCT 19 71	TUE	6												
OCT 20 71	WED	6												
OCT 21 71	THU	6												
OCT 22 71	FRI	99												
OCT 23 71	SAT	6												
OCT 24 71	SUN	99												
OCT 25 71	MON	99												
OCT 26 71	TUE	99												
OCT 27 71	WED	99												
OCT 28 71	THU	99												
OCT 29 71	FRI	99												
OCT 30 71	SAT	99												
OCT 31 71	SUN	99												
NOV 1 71	MON	6												
NOV 2 71	TUE	6												
NOV 3 71	WED	6												
NOV 4 71	THU	99												
NOV 5 71	FRI	99												
NOV 6 71	SAT	99												
NOV 7 71	SUN	99												
NOV 8 71	MON	99												
NOV 9 71	TUE	99												
NOV 10 71	WED	6												
NOV 11 71	THU	6												
NOV 12 71	FRI	99												
NOV 13 71	SAT	6												
NOV 14 71	SUN	99												
NOV 15 71	MON	6												
NOV 16 71	TUE	6												
NOV 17 71	WED	6												
NOV 18 71	THU	99												
NOV 19 71	FRI	99												
NOV 20 71	SAT	6												
NOV 21 71	SUN	99												
NOV 22 71	MON	6												
NOV 23 71	TUE	6												
NOV 24 71	WED	99												
NOV 25 71	THU	99												
NOV 26 71	FRI	99												
NOV 27 71	SAT	6												
NOV 28 71	SUN	99												
NOV 29 71	MON	6												
NOV 30 71	TUE	15												
DEC 1 71	WED	15												
DEC 2 71	THU	15												
DEC 3 71	FRI	99												
DEC 4 71	SAT	15												
DEC 5 71	SUN	99												
DEC 6 71	MON	15												
DEC 7 71	TUE	15												

Date Obsv	Day of Week	Samp type	P-2 Totl IP P	S-2 Totl IN P	Inf Totl P	P-1 Totl P	S-1 Totl P	P-2 Totl P	S-2 Totl P	Inf Turb	P-1 Turb	S-1 Turb	P-2 Turb	S-2 Turb
DEC 8 71	WED	15												
DEC 9 71	THU	15												
DEC 10 71	FRI	99												
DEC 11 71	SAT	15												
DEC 12 71	SUN	99												
DEC 13 71	MON	15												
DEC 14 71	TUE	15												
DEC 15 71	WED	15												
DEC 16 71	THU	99												
DEC 17 71	FRI	99												
DEC 18 71	SAT	15												
DEC 19 71	SUN	99												
DEC 20 71	MON	15												
DEC 21 71	TUE	99												
DEC 22 71	WED	99												
DEC 23 71	THU	99												
DEC 24 71	FRI	99												
DEC 25 71	SAT	99												
DEC 26 71	SUN	99												
DEC 27 71	MON	99												
DEC 28 71	TUE	15												
DEC 29 71	WED	15												
DEC 30 71	THU	15												
DEC 31 71	FRI	99												
JAN 1 72	SAT	99												
JAN 2 72	SUN	99												
JAN 3 72	MON	15												
JAN 4 72	TUE	15												
JAN 5 72	WED	15												
JAN 6 72	THU	99												
JAN 7 72	FRI	99												
JAN 8 72	SAT	15												
JAN 9 72	SUN	99												
JAN 10 72	MON	15												
JAN 11 72	TUE	15												
JAN 12 72	WED	15												
JAN 13 72	THU	99												
JAN 14 72	FRI	99												
JAN 15 72	SAT	15												
JAN 16 72	SUN	99												
JAN 17 72	MON	15												
JAN 18 72	TUE	15												
JAN 19 72	WED	15												
JAN 20 72	THU	15												
JAN 21 72	FRI	99												
JAN 22 72	SAT	15												
JAN 23 72	SUN	99												
JAN 24 72	MON	15												

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Date of Obs	Day of Week	Ship Type	Lat PH	P-1 PH	S-1 PH	P-2 PH	S-2 PH
NOV 19 69	WED	6					
NOV 19 69	WED	4					
NOV 20 69	THU	6					
NOV 20 69	THU	4					
NOV 21 69	FRI	6					
NOV 21 69	FRI	7					
NOV 22 69	SAT	4					
NOV 22 69	SAT	7					
NOV 23 69	SUN	4					
NOV 23 69	SUN	7					
NOV 24 69	MON	6					
NOV 24 69	MON	4					
NOV 25 69	TUE	4					
NOV 25 69	TUE	4					
NOV 26 69	WED	4					
NOV 27 69	THU						
NOV 28 69	FRI						
NOV 29 69	SAT						
NOV 30 69	SUN	4					
DEC 1 69	MON	4					
DEC 1 69	MON	6					
DEC 2 69	TUE	6					
DEC 2 69	TUE	4					
DEC 3 69	WED	6					
DEC 3 69	WED	4					
DEC 4 69	THU	6					
DEC 4 69	THU	4					
DEC 5 69	FRI	6					
DEC 5 69	FRI	7					
DEC 6 69	SAT	4					
DEC 6 69	SAT	7					
DEC 7 69	SUN	4					
DEC 7 69	SUN	7					
DEC 8 69	MON	6					
DEC 8 69	MON	4					
DEC 9 69	TUE	6					
DEC 9 69	TUE	4					
DEC 10 69	WED	6					
DEC 10 69	WED	4					
DEC 11 69	THU	6					
DEC 11 69	THU	4					
DEC 12 69	FRI	7					
DEC 12 69	FRI	6					
DEC 13 69	SAT	7					
DEC 13 69	SAT	4					
DEC 14 69	SUN	7					
DEC 14 69	SUN	4					
DEC 15 69	MON	4					
DEC 15 69	MON	6					
DEC 16 69	TUE	6					
DEC 16 69	TUE	4					
DEC 17 69	WED	6					
DEC 17 69	WED	4					

Date Obsv	Day of Week	Ship Type	Inf PH	P-1 PH	P-1 PH	S-1 PH	P-2 PH	P-2 PH	S-2 PH
DEC 18 43	THU	6							
DEC 18 49	THU								
DEC 19 49	FRI								
DEC 20 49	SAT								
DEC 21 49	SUN								
DEC 22 49	MON								
DEC 23 49	TUE								
DEC 24 49	WED								
DEC 25 49	THU								
DEC 26 49	FRI								
DEC 27 49	SAT								
DEC 28 49	SUN								
DEC 29 49	MON								
DEC 30 49	TUE								
DEC 31 49	TUE								
JAN 1 70	THU								
JAN 2 70	FRI								
JAN 3 70	MON								
JAN 4 70	TUE								
JAN 5 70	WED								
JAN 6 70	THU								
JAN 7 70	FRI								
JAN 8 70	SUN								
JAN 9 70	FRI								
JAN 10 70	SAT								
JAN 11 70	SUN								
JAN 12 70	MON								
JAN 13 70	TUE								
JAN 14 70	WED								
JAN 15 70	THU								
JAN 16 70	FRI								
JAN 17 70	SAT								
JAN 18 70	SUN								
JAN 19 70	MON								
JAN 20 70	TUE								
JAN 21 70	WED								
JAN 22 70	THU								
JAN 23 70	FRI								
JAN 24 70	SAT								
JAN 25 70	SUN								
JAN 26 70	MON								
JAN 27 70	TUE								
JAN 28 70	WED								
JAN 29 70	THU								
JAN 30 70	FRI								
JAN 31 70	SAT								
FEB 1 70	SUN								
FEB 2 70	MON								
FEB 3 70	TUE								
FEB 4 70	WED								
FEB 5 70	THU								
FEB 6 70	FRI								
FEB 7 70	SAT								
FEB 8 70	SUN								

Date of Obs	Day of Week	Samp Type	Inf PH	P-1 PH	P-1 S-1 PH	P-2 PH	P-2 S-2 PH
FEB 9 70	MON	4	--	--	--	--	--
FEB 10 70	TUE	4	--	--	--	--	--
FEB 11 70	WED	4	--	--	--	--	--
FEB 12 70	THU	4	--	--	--	--	--
FEB 13 70	FRI	7	--	--	--	--	--
FEB 14 70	SAT	7	--	--	--	--	--
FEB 15 70	SUN	7	--	--	--	--	--
FEB 16 70	MON	4	--	--	--	--	--
FEB 17 70	TUE	4	--	--	--	--	--
FEB 18 70	WED	4	--	--	--	--	--
FEB 19 70	THU	4	--	--	--	--	--
FEB 20 70	FRI	7	--	--	--	--	--
FEB 21 70	SAT	7	--	--	--	--	--
FEB 22 70	SUN	7	--	--	--	--	--
FEB 23 70	MON	4	--	--	--	--	--
FEB 24 70	TUE	4	--	--	--	--	--
FEB 25 70	WED	4	--	--	--	--	--
FEB 26 70	THU	4	--	--	--	--	--
FEB 27 70	FRI	4	--	--	--	--	--
FEB 28 70	SAT	4	--	--	--	--	--
MAR 1 70	SUN	4	--	--	--	--	--
MAR 2 70	MON	4	--	--	--	--	--
MAR 3 70	TUE	4	--	--	--	--	--
MAR 4 70	WED	4	--	--	--	--	--
MAR 5 70	THU	4	--	--	--	--	--
MAR 6 70	FRI	7	--	--	--	--	--
MAR 7 70	SAT	7	--	--	--	--	--
MAR 8 70	SUN	7	--	--	--	--	--
MAR 9 70	MON	4	--	--	--	--	--
MAR 10 70	TUE	4	--	--	--	--	--
MAR 11 70	WED	4	--	--	--	--	--
MAR 12 70	THU	4	--	--	--	--	--
MAR 13 70	FRI	4	--	--	--	--	--
MAR 14 70	SAT	4	--	--	--	--	--
MAR 15 70	SUN	4	--	--	--	--	--
MAR 16 70	MON	4	--	--	--	--	--
MAR 17 70	TUE	4	--	--	--	--	--
MAR 18 70	WED	4	--	--	--	--	--
MAR 19 70	THU	4	--	--	--	--	--
MAR 20 70	FRI	4	--	--	--	--	--
MAR 21 70	SAT	4	--	--	--	--	--
MAR 22 70	SUN	4	--	--	--	--	--
MAR 23 70	MON	4	--	--	--	--	--
MAR 24 70	TUE	4	--	--	--	--	--
MAR 25 70	WED	4	--	--	--	--	--
MAR 26 70	THU	4	--	--	--	--	--
MAR 27 70	FRI	4	--	--	--	--	--
MAR 28 70	SAT	4	--	--	--	--	--
MAR 29 70	SUN	4	--	--	--	--	--
MAR 30 70	MON	4	--	--	--	--	--
MAR 31 70	TUE	4	--	--	--	--	--
APR 1 70	WED	4	--	--	--	--	--
APR 2 70	THU	4	--	--	--	--	--

Date of Obsv	Day of Week	Samp type	Inf PH	P-1 PH	P-1 PH	S-1 PH	P-2 PH	P-2 PH	S-2 PH
APR 3 70	FRI	7	---	---	---	---	---	---	---
APR 4 70	SAT	7	---	---	---	---	---	---	---
APR 5 70	SUN	7	---	---	---	---	---	---	---
APR 6 70	MON	4	---	---	---	---	---	---	---
APR 7 70	TUE	4	---	---	---	---	---	---	---
APR 8 70	WED	4	---	---	---	---	---	---	---
APR 9 70	THU	4	---	---	---	---	---	---	---
APR 10 70	FRI	7	---	---	---	---	---	---	---
APR 11 70	SAT	7	---	---	---	---	---	---	---
APR 12 70	SUN	7	---	---	---	---	---	---	---
APR 13 70	FRI	7	---	---	---	---	---	---	---
APR 14 70	SAT	7	---	---	---	---	---	---	---
APR 15 70	SUN	7	---	---	---	---	---	---	---
APR 16 70	MON	4	---	---	---	---	---	---	---
APR 17 70	TUE	4	---	---	---	---	---	---	---
APR 18 70	WED	4	---	---	---	---	---	---	---
APR 19 70	THU	4	---	---	---	---	---	---	---
APR 20 70	FRI	7	---	---	---	---	---	---	---
APR 21 70	SAT	7	---	---	---	---	---	---	---
APR 22 70	SUN	7	---	---	---	---	---	---	---
APR 23 70	MON	4	---	---	---	---	---	---	---
APR 24 70	TUE	4	---	---	---	---	---	---	---
APR 25 70	WED	4	---	---	---	---	---	---	---
APR 26 70	THU	4	---	---	---	---	---	---	---
APR 27 70	FRI	7	---	---	---	---	---	---	---
APR 28 70	SAT	7	---	---	---	---	---	---	---
APR 29 70	SUN	7	---	---	---	---	---	---	---
APR 30 70	MON	4	---	---	---	---	---	---	---
MAY 1 70	TUE	4	---	---	---	---	---	---	---
MAY 2 70	WED	4	---	---	---	---	---	---	---
MAY 3 70	THU	4	---	---	---	---	---	---	---
MAY 4 70	FRI	7	---	---	---	---	---	---	---
MAY 5 70	SAT	7	---	---	---	---	---	---	---
MAY 6 70	SUN	7	---	---	---	---	---	---	---
MAY 7 70	MON	4	---	---	---	---	---	---	---
MAY 8 70	TUE	4	---	---	---	---	---	---	---
MAY 9 70	WED	4	---	---	---	---	---	---	---
MAY 10 70	THU	4	---	---	---	---	---	---	---
MAY 11 70	FRI	7	---	---	---	---	---	---	---
MAY 12 70	SAT	7	---	---	---	---	---	---	---
MAY 13 70	SUN	7	---	---	---	---	---	---	---
MAY 14 70	MON	4	---	---	---	---	---	---	---
MAY 15 70	TUE	4	---	---	---	---	---	---	---
MAY 16 70	WED	4	---	---	---	---	---	---	---
MAY 17 70	THU	4	---	---	---	---	---	---	---
MAY 18 70	FRI	7	---	---	---	---	---	---	---
MAY 19 70	SAT	7	---	---	---	---	---	---	---
MAY 20 70	SUN	7	---	---	---	---	---	---	---
MAY 21 70	MON	4	---	---	---	---	---	---	---
MAY 22 70	TUE	4	---	---	---	---	---	---	---
MAY 23 70	WED	4	---	---	---	---	---	---	---
MAY 24 70	THU	4	---	---	---	---	---	---	---
MAY 25 70	FRI	7	---	---	---	---	---	---	---
MAY 26 70	SAT	7	---	---	---	---	---	---	---
MAY 27 70	SUN	7	---	---	---	---	---	---	---
MAY 28 70	MON	4	---	---	---	---	---	---	---
MAY 29 70	TUE	4	---	---	---	---	---	---	---
MAY 30 70	WED	4	---	---	---	---	---	---	---
MAY 31 70	THU	4	---	---	---	---	---	---	---

Date of Obsv	Day of Week	Sand type	Inf PH	P-1 PH	P-1 PH	S-1 PH	P-2 PH	P-2 PH	S-2 PH
MAY 26 70	TUE	6							
MAY 27 70	WED								
MAY 28 70	THU	6							
MAY 29 70	FRI								
MAY 30 70	SAT	6							
MAY 31 70	SUN	6							
JUN 1 70	MON	6							
JUN 2 70	TUE	6							
JUN 3 70	WED	6							
JUN 4 70	THU	6							
JUN 5 70	FRI								
JUN 6 70	SAT	6							
JUN 7 70	SUN	6							
JUN 8 70	MON	6							
JUN 9 70	TUE	6							
JUN 10 70	WED	9							
JUN 11 70	THU	9							
JUN 12 70	FRI								
JUN 13 70	SAT	6							
JUN 14 70	SUN	6							
JUN 15 70	MON	6							
JUN 16 70	TUE	6							
JUN 17 70	WED	6							
JUN 18 70	THU	6							
JUN 19 70	FRI								
JUN 20 70	SAT	6							
JUN 21 70	SUN	6							
JUN 22 70	MON	6							
JUN 23 70	TUE	6							
JUN 24 70	WED	6							
JUN 25 70	THU	6							
JUN 26 70	FRI								
JUN 27 70	SAT	6							
JUN 28 70	SUN								
JUN 29 70	MON								
JUN 30 70	TUE	6							
JUL 1 70	WED	6							
JUL 2 70	THU	6							
JUL 3 70	FRI								
JUL 4 70	SAT	6							
JUL 5 70	SUN	6							
JUL 6 70	MON	6							
JUL 7 70	TUE	6							
JUL 8 70	WED	6							
JUL 9 70	THU	6							
JUL 10 70	FRI								
JUL 11 70	SAT	6							
JUL 12 70	SUN	6							
JUL 13 70	MON	6							
JUL 14 70	TUE								
JUL 15 70	WED								
JUL 16 70	THU								
JUL 17 70	FRI								

Date of Obs	Day of Week	Samp Type	Inf PH	P-1 PH	S-1 PE	P-2 PH	S-2 PH
JUL 18 70	SAT						
JUL 19 70	SUN	6					
JUL 20 70	MON	6					
JUL 21 70	TUE						
JUL 22 70	WED						
JUL 23 70	THU	6					
JUL 24 70	FRI						
JUL 25 70	SAT						
JUL 26 70	SUN	6					
JUL 27 70	MON	6					
JUL 28 70	TUE	6					
JUL 29 70	WED						
JUL 30 70	THU						
JUL 31 70	FRI						
AUG 1 70	SAT						
AUG 2 70	SUN						
AUG 3 70	MON						
AUG 4 70	TUE						
AUG 5 70	WED	6					
AUG 6 70	THU	6					
AUG 7 70	FRI						
AUG 8 70	SAT						
AUG 9 70	SUN	6					
AUG 10 70	MON	6					
AUG 11 70	TUE						
AUG 12 70	WED	6					
AUG 13 70	THU	6					
AUG 14 70	FRI						
AUG 15 70	SAT	6					
AUG 16 70	SUN	6					
AUG 17 70	MON	6					
AUG 18 70	TUE	11					
AUG 19 70	WED						
AUG 20 70	THU	6					
AUG 21 70	FRI						
AUG 22 70	SAT						
AUG 23 70	SUN	6					
AUG 24 70	MON	6					
AUG 25 70	TUE	6					
AUG 26 70	WED	6					
AUG 27 70	THU	6					
AUG 28 70	FRI						
AUG 29 70	SAT						
AUG 30 70	SUN	6					
AUG 31 70	MON	6					
SEP 1 70	TUE	6					
SEP 2 70	WED	6					
SEP 3 70	THU	6					
SEP 4 70	FRI	6					
SEP 5 70	SAT	6					
SEP 6 70	SUN	6					
SEP 7 70	MON	6					
SEP 8 70	TUE	6					
SEP 9 70	WED	10					
SEP 10 70	THU	6					
SEP 11 70	FRI	10					

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Date Obsv	Day of Week	Samp Type	Inf PH	P-1 PH	M-1 PH	S-1 PH	P-2 PH	S-2 PH
SEP 11 70	FRI							
SEP 12 70	SAT	5						
SEP 13 70	SUN	12						
SEP 14 70	MON	6						
SEP 15 70	TUE	6						
SEP 16 70	WED	12						
SEP 17 70	THU	6						
SEP 18 70	FRI	12						
SEP 19 70	SAT	6						
SEP 20 70	SUN	6						
SEP 21 70	MON	12						
SEP 22 70	TUE	6						
SEP 23 70	WED	12						
SEP 24 70	THU	6						
SEP 25 70	FRI	12						
SEP 26 70	SAT	6						
SEP 27 70	SUN	6						
SEP 28 70	MON	12						
SEP 29 70	TUE	6						
SEP 30 70	WED	12						
OCT 1 70	THU	6						
OCT 2 70	FRI	12						
OCT 3 70	SAT	6						
OCT 4 70	SUN	4						
OCT 5 70	MON	13						
OCT 6 70	TUE	6						
OCT 7 70	WED	6						
OCT 8 70	THU	4						
OCT 9 70	FRI							
OCT 10 70	SAT							
OCT 11 70	SUN							
OCT 12 70	MON							
OCT 13 70	TUE							
OCT 14 70	WED							
OCT 15 70	THU							
OCT 16 70	FRI							
OCT 17 70	SAT							
OCT 18 70	SUN	6						
OCT 19 70	MON	12						
OCT 20 70	TUE	6						
OCT 21 70	WED	12						
OCT 22 70	THU	6						
OCT 23 70	FRI							
OCT 24 70	SAT							
OCT 25 70	SUN							
OCT 26 70	MON							
OCT 27 70	TUE							
OCT 28 70	WED							
OCT 29 70	THU							
OCT 30 70	FRI							
OCT 31 70	SAT							

Date of Obs	Day of Week	Samp Type	Inf PH	P-1 PH	P-1 PH	S-1 PH	P-2 PH	P-2 PH	S-2 PH
OCT 21 70	FRI	6							
OCT 22 70	THU	6							
OCT 23 70	FRI	12							
OCT 24 70	SAT								
OCT 25 70	SUN	13							
OCT 26 70	MON	12							
OCT 27 70	TUE	6							
OCT 28 70	WED	12							
OCT 29 70	THU	6							
OCT 30 70	FRI	12							
OCT 31 70	SAT								
NOV 1 70	SUN	6							
NOV 2 70	MON	10							
NOV 3 70	TUE	6							
NOV 4 70	WED								
NOV 5 70	THU	6							
NOV 6 70	FRI	10							
NOV 7 70	SAT								
NOV 8 70	SUN	6							
NOV 9 70	MON	10							
NOV 10 70	TUE	6							
NOV 11 70	WED	10							
NOV 12 70	THU	6							
NOV 13 70	FRI								
NOV 14 70	SAT								
NOV 15 70	SUN								
NOV 16 70	MON								
NOV 17 70	TUE								
NOV 18 70	WED								
NOV 19 70	THU								
NOV 20 70	FRI								
NOV 21 70	SAT								
NOV 22 70	SUN								
NOV 23 70	MON								
NOV 24 70	TUE	6							
NOV 25 70	THU								
NOV 26 70	FRI								
NOV 27 70	SAT								
NOV 28 70	SUN	6							
NOV 29 70	MON	6							
NOV 30 70	TUE	6							
DEC 1 70	WED	12							
DEC 2 70	THU	6							
DEC 3 70	FRI	6							

Date of Obsv	Day of Week	Swamp Type	Inf PH	P-1 PH	S-1 PH	P-2 PH	S-2 PH
DEC 1 70	THU	12					
DEC 4 70	FRI	99					
DEC 5 70	SAT	99					
DEC 6 70	SUN	6					
DEC 7 70	SUN	12					
DEC 7 70	MON	94					
DEC 8 70	TUE	6					
DEC 8 70	TUE	12					
DEC 9 70	WED	6					
DEC 10 70	THU	6					
DEC 10 70	THU	12					
DEC 11 70	FRI	99					
DEC 12 70	SAT	99					
DEC 13 70	SUN	6					
DEC 14 70	MON	6					
DEC 15 70	TUE	6	6.7	6.7	6.7	6.7	6.8
DEC 16 70	WED	11	7.0	7.1	7.0	7.0	7.2
DEC 17 70	THU	6	7.3	7.5	7.2	7.3	7.2
DEC 20 70	SUN	6	7.4	7.3	7.2	7.4	7.4
DEC 21 70	MON	6	7.4	7.3	7.2	7.4	7.3
DEC 22 70	TUE	99					
DEC 23 70	WED	99					
DEC 24 70	THU	99					
DEC 25 70	FRI	99					
DEC 26 70	SAT	99					
DEC 27 70	SUN	6	7.5	7.3	7.0	7.3	7.3
DEC 28 70	MON	6	7.6	7.2	7.2	7.5	7.6
DEC 29 70	TUE	6	7.5	7.2	7.2	7.5	7.4
DEC 30 70	WED	6	7.4	7.3	7.3	7.4	7.3
DEC 31 70	THU	99					
JAN 1 71	FRI	99					
JAN 2 71	SAT	99					
JAN 3 71	SUN	6	7.3	7.3	7.2	7.4	7.4
JAN 4 71	MON	6	7.2	7.4	7.4	7.4	7.4
JAN 5 71	TUE	6	7.4	7.4	7.4	7.4	7.4
JAN 6 71	WED	6	7.6	7.6	7.5	7.6	7.6
JAN 7 71	THU	6					
JAN 8 71	FRI	99					
JAN 9 71	SAT	99					
JAN 10 71	SUN	6					
JAN 11 71	MON	6	7.4	7.6	7.6	7.5	7.6
JAN 12 71	TUE	6					
JAN 13 71	WED	6	7.7	7.6	7.7	7.7	7.7
JAN 14 71	THU	6					
JAN 15 71	FRI	99					
JAN 16 71	SAT	99					
JAN 17 71	SUN	6					
JAN 18 71	MON	6	7.4	7.4	7.3	7.2	7.5
JAN 19 71	TUE	6					
JAN 20 71	WED	6	7.5	7.7	7.8	7.7	7.4
JAN 21 71	THU	6					
JAN 22 71	FRI	99					
JAN 23 71	SAT	99					

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Date of Obs	Day of Week	Swamp Type	Ind PH	P-1 PH	P-1 PH	S-1 PH	P-2 PH	P-2 PH	S-2 PH
JAN 24 71	SUN	6	7.7	7.7	7.5	7.7	7.7	7.7	7.7
JAN 25 71	MON	6	6.9	7.2	7.3	7.0	7.3	7.0	7.1
JAN 26 71	TUE	6							
JAN 27 71	WED	6							
JAN 28 71	THU	6							
JAN 29 71	FRI	99							
JAN 30 71	SAT	99							
JAN 31 71	SUN	99							
FEB 1 71	MON	6	6.9	7.1	6.9	6.9	7.0	6.9	6.9
FEB 2 71	TUE	6	7.2	7.2	7.1	7.1	7.1	7.1	7.0
FEB 3 71	WED	6							
FEB 4 71	THU	6							
FEB 5 71	FRI	99							
FEB 6 71	SAT	99							
FEB 7 71	SUN	6	6.9	6.9	6.9	7.0	7.0	7.0	6.9
FEB 8 71	MON	6							
FEB 9 71	TUE	6	7.0	7.1	7.1	7.1	7.0	7.1	7.1
FEB 10 71	WED	6							
FEB 11 71	THU	6							
FEB 12 71	FRI	99							
FEB 13 71	SAT	99							
FEB 14 71	SUN	6	7.1	6.9	6.9	7.0	6.9	7.1	6.9
FEB 15 71	MON	6							
FEB 16 71	TUE	6	7.2	7.0	7.1	7.1	7.1	7.2	7.1
FEB 17 71	WED	6							
FEB 18 71	THU	6							
FEB 19 71	FRI	99							
FEB 20 71	SAT	99							
FEB 21 71	SUN	6	6.7	6.8	6.8	7.0	6.8	7.0	6.9
FEB 22 71	MON	6							
FEB 23 71	TUE	6	6.8	6.8	6.8	6.8	6.7	6.8	6.8
FEB 24 71	WED	6							
FEB 25 71	THU	6							
FEB 26 71	FRI	99							
FEB 27 71	SAT	99							
FEB 28 71	SUN	6	7.0	7.0	7.0	7.0	7.0	7.0	7.0
MAR 1 71	MON	6							
MAR 2 71	TUE	6							
MAR 3 71	WED	6							
MAR 4 71	THU	6							
MAR 5 71	FRI	99							
MAR 6 71	SAT	99							
MAR 7 71	SUN	6	7.1	7.3	7.3	7.2	7.4	7.0	7.0
MAR 8 71	MON	6							
MAR 9 71	TUE	6							
MAR 10 71	WED	6							
MAR 11 71	THU	6							
MAR 12 71	FRI	99							
MAR 13 71	SAT	99							
MAR 14 71	SUN	6	6.9	6.9	6.9	6.9	6.9	6.9	7.0
MAR 15 71	MON	6	6.7						
MAR 16 71	TUE	6	7.2	7.4	7.4	7.5	7.4	7.4	7.5
MAR 17 71	WED	6							

Date of Obs	Day of Week	Susp Type	Inf PH	P-1 PH	P-1 PH	S-1 PH	P-2 PH	P-2 PH	S-2 PH
MAR 18 71	THU	6	8.4						
MAR 19 71	FRI	99							
MAR 20 71	SAT	99							
MAR 21 71	SUN	6	7.4	7.4	7.5	7.4	7.5	7.5	7.5
MAR 22 71	MON	6	7.0	7.1	7.2	7.2	7.2	7.2	7.2
MAR 23 71	TUE	6							
MAR 24 71	WED	6							
MAR 25 71	THU	6							
MAR 26 71	FRI	99							
MAR 27 71	SAT	99							
MAR 28 71	SUN	6							
MAR 29 71	MON	6	6.8	6.9	6.9	6.8	6.9	6.9	6.9
MAR 30 71	TUE	6							
MAR 31 71	WED	6	6.9	7.0	7.0	7.0	7.0	7.0	7.0
APR 1 71	THU	6							
APR 2 71	FRI	99							
APR 3 71	SAT	99							
APR 4 71	SUN	6							
APR 5 71	MON	6	6.9	7.3	7.3	7.3	7.3	7.3	7.4
APR 6 71	TUE	6							
APR 7 71	WED	6							
APR 8 71	THU	6							
APR 9 71	FRI	99							
APR 10 71	SAT	99							
APR 11 71	SUN	99							
APR 12 71	MON	6	7.2	7.2	7.2	7.3	7.3	7.3	7.3
APR 13 71	TUE	6							
APR 14 71	WED	6	7.1	7.2	7.2	7.3	7.2	7.2	7.2
APR 15 71	THU	6							
APR 16 71	FRI	99							
APR 17 71	SAT	99							
APR 18 71	SUN	6							
APR 19 71	MON	6	7.2	7.3	7.3	7.3	7.3	7.4	7.4
APR 20 71	TUE	6							
APR 21 71	WED	6	7.0	7.1	7.1	7.2	7.1	7.1	7.1
APR 22 71	THU	6							
APR 23 71	FRI	99							
APR 24 71	SAT	99							
APR 25 71	SUN	6							
APR 26 71	MON	6	7.3	7.3	7.3	7.3	7.3	7.3	7.3
APR 27 71	TUE	6							
APR 28 71	WED	6	7.2	7.2	7.3	7.2	7.3	7.2	7.2
APR 29 71	THU	6							
APR 30 71	FRI	99							
MAY 1 71	SAT	99							
MAY 2 71	SUN	6	7.2	7.5	7.4	7.3	7.4	7.3	7.4
MAY 3 71	MON	6							
MAY 4 71	TUE	6							
MAY 5 71	WED	99							
MAY 6 71	THU	6							
MAY 7 71	FRI	99							
MAY 8 71	SAT	99							
MAY 9 71	SUN	6							

Date of Obs	Day of Week	Samp Type	Inf PH	P-1 PH	P-1 PH	S-1 PH	P-2 PH	P-2 PH	S-2 PH
MAY 10 71	MON	99							
MAY 11 71	TUE	99							
MAY 12 71	WED	99							
MAY 13 71	THU	99							
MAY 14 71	FRI	99							
MAY 15 71	SAT	99							
MAY 16 71	SUN	6							
MAY 17 71	MON	6	7.1	7.2	7.1	7.3	7.2	7.2	7.1
MAY 18 71	TUE	6							
MAY 19 71	WED	99							
MAY 20 71	THU	6							
MAY 21 71	FRI	99							
MAY 22 71	SAT	99							
MAY 23 71	SUN	6							
MAY 24 71	MON	6							
MAY 25 71	TUE	6							
MAY 26 71	WED	6							
MAY 27 71	THU	6							
MAY 28 71	FRI	99							
MAY 29 71	SAT	99							
MAY 30 71	SUN	99							
MAY 31 71	MON	6							
JUN 1 71	TUE	6							
JUN 2 71	WED	6							
JUN 3 71	THU	6							
JUN 4 71	FRI	99							
JUN 5 71	SAT	99							
JUN 6 71	SUN	6							
JUN 7 71	MON	6							
JUN 8 71	TUE	6							
JUN 9 71	WED	6							
JUN 10 71	THU	6							
JUN 11 71	FRI	99							
JUN 12 71	SAT	99							
JUN 13 71	SUN	6							
JUN 14 71	MON	6							
JUN 15 71	TUE	6							
JUN 16 71	WED	6							
JUN 17 71	THU	99							
JUN 18 71	FRI	99							
JUN 19 71	SAT	99							
JUN 20 71	SUN	99							
JUN 21 71	MON	99							
JUN 22 71	TUE	6							
JUN 23 71	WED	99							
JUN 24 71	THU	6							
JUN 25 71	FRI	99							
JUN 26 71	SAT	6							
JUN 27 71	SUN	99							
JUN 28 71	MON	6							
JUN 29 71	TUE	6							
JUN 30 71	WED	6							
JUN 1 71	THU	6							

Date Obs	Day of Week	Samp Type	Inf PH	P-1 PH	S-1 PH	P-2 PH	S-2 PH
JUL 2 71	FRI	99					
JUL 3 71	SAT	99					
JUL 4 71	SUN	99					
JUL 5 71	MON	6					
JUL 6 71	TUE	6					
JUL 7 71	WED	6					
JUL 8 71	THU	6					
JUL 9 71	FRI	99					
JUL 10 71	SAT	6					
JUL 11 71	SUN	99					
JUL 12 71	MON	6					
JUL 13 71	TUE	6					
JUL 14 71	WED	6					
JUL 15 71	THU	6					
JUL 16 71	FRI	99					
JUL 17 71	SAT	6					
JUL 18 71	SUN	99					
JUL 19 71	MON	6					
JUL 20 71	TUE	6					
JUL 21 71	WED	6					
JUL 22 71	THU	6					
JUL 23 71	FRI	99					
JUL 24 71	SAT	6					
JUL 25 71	SUN	99					
JUL 26 71	MON	6					
JUL 27 71	TUE	6					
JUL 28 71	WED	6					
JUL 29 71	THU	6					
JUL 30 71	FRI	99					
JUL 31 71	SAT	99					
AUG 1 71	SUN	99					
AUG 2 71	MON	6					
AUG 3 71	TUE	6					
AUG 4 71	WED	6					
AUG 5 71	THU	6					
AUG 6 71	FRI	99					
AUG 7 71	SAT	99					
AUG 8 71	SUN	99					
AUG 9 71	MON	6					
AUG 10 71	TUE	6					
AUG 11 71	WED	6					
AUG 12 71	THU	6					
AUG 13 71	FRI	99					
AUG 14 71	SAT	6					
AUG 15 71	SUN	99					
AUG 16 71	MON	6					
AUG 17 71	TUE	6					
AUG 18 71	WED	6					
AUG 19 71	THU	6					
AUG 20 71	FRI	99					
AUG 21 71	SAT	6					
AUG 22 71	SUN	99					
AUG 23 71	MON	6					

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Date of Obs	Day of Week	Samp Type	Inf PH	P-1 PH	S-1 PH	P-2 PH	S-2 PH
AUG 26 71	TUE	6					
AUG 25 71	WED	6					
AUG 26 71	THU	6					
AUG 27 71	FRI	99					
AUG 28 71	SAT	6					
AUG 29 71	SUN	99					
AUG 30 71	MON	6					
AUG 31 71	TUE	6					
SEP 1 71	WED	6					
SEP 2 71	THU	6					
SEP 3 71	FRI	99					
SEP 4 71	SAT	99					
SEP 5 71	SUN	99					
SEP 6 71	MON	99					
SEP 7 71	TUE	6					
SEP 8 71	WED	6					
SEP 9 71	THU	6					
SEP 10 71	FRI	99					
SEP 11 71	SAT	6					
SEP 12 71	SUN	99					
SEP 13 71	MON	6					
SEP 14 71	TUE	99					
SEP 15 71	WED	6					
SEP 16 71	THU	6					
SEP 17 71	FRI	99					
SEP 18 71	SAT	6					
SEP 19 71	SUN	99					
SEP 20 71	MON	6					
SEP 21 71	TUE	6					
SEP 22 71	WED	6					
SEP 23 71	THU	6					
SEP 24 71	FRI	99					
SEP 25 71	SAT	6					
SEP 26 71	SUN	99					
SEP 27 71	MON	6					
SEP 28 71	TUE	99					
SEP 29 71	WED	99					
SEP 30 71	THU	6					
OCT 1 71	FRI	99					
OCT 2 71	SAT	6					
OCT 3 71	SUN	99					
OCT 4 71	MON	6					
OCT 5 71	TUE	6					
OCT 6 71	WED	6					
OCT 7 71	THU	99					
OCT 8 71	FRI	99					
OCT 9 71	SAT	99					
OCT 10 71	SUN	6					
OCT 11 71	MON	6					
OCT 12 71	TUE	6					
OCT 13 71	WED	6					
OCT 14 71	THU	6					
OCT 15 71	FRI	99					

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Date of Obs	Day of Week	Samp of Type	Inf PH	P-1 PH	S-1 PH	P-2 PH	S-2 PH
OCT 16 71	SAT	6					
OCT 17 71	SUN	99					
OCT 18 71	MON	6					
OCT 19 71	TUE	6					
OCT 20 71	WED	6					
OCT 21 71	THU	6					
OCT 22 71	FRI	99					
OCT 23 71	SAT	6					
OCT 24 71	SUN	99					
OCT 25 71	MON	99					
OCT 26 71	TUE	99					
OCT 27 71	WED	99					
OCT 28 71	THU	99					
OCT 29 71	FRI	99					
OCT 30 71	SAT	99					
OCT 31 71	SUN	99					
NOV 1 71	MON	6					
NOV 2 71	TUE	6					
NOV 3 71	WED	6					
NOV 4 71	THU	99					
NOV 5 71	FRI	99					
NOV 6 71	SAT	99					
NOV 7 71	SUN	99					
NOV 8 71	MON	99					
NOV 9 71	TUE	99					
NOV 10 71	WED	6					
NOV 11 71	THU	6					
NOV 12 71	FRI	99					
NOV 13 71	SAT	6					
NOV 14 71	SUN	99					
NOV 15 71	MON	6					
NOV 16 71	TUE	6					
NOV 17 71	WED	6					
NOV 18 71	THU	6					
NOV 19 71	FRI	99					
NOV 20 71	SAT	6					
NOV 21 71	SUN	99					
NOV 22 71	MON	6					
NOV 23 71	TUE	6					
NOV 24 71	WED	99					
NOV 25 71	THU	99					
NOV 26 71	FRI	99					
NOV 27 71	SAT	99					
NOV 28 71	SUN	6					
NOV 29 71	MON	99					
NOV 30 71	TUE	15					
DEC 1 71	WED	15					
DEC 2 71	THU	15					
DEC 3 71	FRI	99					
DEC 4 71	SAT	15					
DEC 5 71	SUN	99					
DEC 6 71	MON	15					
DEC 7 71	TUE	15					

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Date of Obsv	Day of Week	Seep Type	Inf PH	P-1 PH	S-1 PH	P-2 PH	S-2 PH
DEC 8 71	WED	15	--	--	--	--	--
DEC 9 71	THU	15	--	--	--	--	--
DEC 10 71	FRI	99	--	--	--	--	--
DEC 11 71	SAT	15	--	--	--	--	--
DEC 12 71	SUN	99	--	--	--	--	--
DEC 13 71	MON	15	--	--	--	--	--
DEC 14 71	TUE	15	--	--	--	--	--
DEC 15 71	WED	15	--	--	--	--	--
DEC 16 71	THU	99	--	--	--	--	--
DEC 17 71	FRI	15	--	--	--	--	--
DEC 18 71	SAT	15	--	--	--	--	--
DEC 19 71	SUN	99	--	--	--	--	--
DEC 20 71	MON	15	--	--	--	--	--
DEC 21 71	TUE	99	--	--	--	--	--
DEC 22 71	WED	99	--	--	--	--	--
DEC 23 71	THU	99	--	--	--	--	--
DEC 24 71	FRI	99	--	--	--	--	--
DEC 25 71	SAT	99	--	--	--	--	--
DEC 26 71	SUN	99	--	--	--	--	--
DEC 27 71	MON	99	--	--	--	--	--
DEC 28 71	TUE	15	--	--	--	--	--
DEC 29 71	WED	15	--	--	--	--	--
DEC 30 71	THU	15	--	--	--	--	--
DEC 31 71	FRI	99	--	--	--	--	--
JAN 1 72	SAT	99	--	--	--	--	--
JAN 2 72	SUN	99	--	--	--	--	--
JAN 3 72	MON	15	--	--	--	--	--
JAN 4 72	TUE	15	--	--	--	--	--
JAN 5 72	WED	15	--	--	--	--	--
JAN 6 72	THU	15	--	--	--	--	--
JAN 7 72	FRI	99	--	--	--	--	--
JAN 8 72	SAT	15	--	--	--	--	--
JAN 9 72	SUN	99	--	--	--	--	--
JAN 10 72	MON	15	--	--	--	--	--
JAN 11 72	TUE	15	--	--	--	--	--
JAN 12 72	WED	15	--	--	--	--	--
JAN 13 72	THU	99	--	--	--	--	--
JAN 14 72	FRI	99	--	--	--	--	--
JAN 15 72	SAT	15	--	--	--	--	--
JAN 16 72	SUN	99	--	--	--	--	--
JAN 17 72	MON	15	--	--	--	--	--
JAN 18 72	TUE	15	--	--	--	--	--
JAN 19 72	WED	15	--	--	--	--	--
JAN 20 72	THU	15	--	--	--	--	--
JAN 21 72	FRI	99	--	--	--	--	--
JAN 22 72	SAT	15	--	--	--	--	--
JAN 23 72	SUN	99	--	--	--	--	--
JAN 24 72	MON	15	--	--	--	--	--

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APPENDIX B

ABSTRACTS OF PUBLICATIONS RESULTING FROM PROJECT

VARIATIONS IN CHARACTERISTICS OF WASTEWATER INFLUENT AT THE MASON FARM
WASTEWATER TREATMENT PLANT, CHAPEL HILL, NORTH CAROLINA.

University of North Carolina, Chapel Hill, Wastewater Research Center.

Robert L. Hanson, William C. Walker, and James C. Brown.
Wastewater Research Center Report No. 13, December, 1970. 47 pp. EPA-
WQO Contract No. 14-12-505.

Variations in characteristics of wastewater from the Town of Chapel Hill (N. C.) were studied. Composite samples of domestic wastewater influent were collected at 2-hr intervals over 24-hr periods on each of the seven days of the week so that diurnal variations in flow and constituent concentrations and loadings could be observed. Samples were analyzed for BOD, COD, TOC, nitrogen, phosphorus, MBAS, and specific solids and metal constituents. Influent flow was found to vary from 30 to 144 % of average with the maximum flow occurring between 1000-1200 hours and the minimum flow between 0400-0600 hours. Wastewater constituents showed a wide range of concentrations and loadings. Generally maximum concentrations and loadings occurred between 1000-1400 hours and the minimum values between 0600-0800 hours. The ratio of maximum to minimum concentrations for the constituents varied from 4-12 to one; for loadings, from 10-20 to one.

NITRIFICATION AND DENITRIFICATION - A SELECTED BIBLIOGRAPHY.

University of North Carolina, Chapel Hill, Wastewater Research Center.

Ronald C. Sims and Linda W. Little.
Wastewater Research Center Report No. 14, February, 1971. 19 pp. EPA-
WQO Contract No. 14-12-505.

Descriptors: *Bibliographies, *Water pollution sources, *Water pollution effects, *Water pollution control, *Nitrogen, Soils, Effluents, Sewage treatment.

This report comprises a selected bibliography on nitrification, and denitrification pertinent to the microbiological processes involved; transformations of nitrogen in water, wastewater, and soil; sources of nitrogen in water and wastewater; and methods for removing nitrogen from wastewater.

ACTIVATED SLUDGE MODIFICATIONS FOR ENHANCEMENT OF TRICKLING FILTER
PLANT PERFORMANCE. I. Design, Operation, and BOD Removal in the Units.
II. Nitrification.

University of North Carolina, Chapel Hill, Wastewater Research Center.

Donald E. Francisco, Linda W. Little, and James C. Lamb III.
Wastewater Research Center Report No. 15, April, 1971. 43 pp. EPA-WQO
Contract No. 14-12-505.

Presented at the 20th Annual Southern Water Resources and Pollution
Control Conference, Chapel Hill, North Carolina, April 2, 1971.

Enhancement of trickling filter plant performance by subsequent activated sludge treatment was investigated. Five activated sludge pilot plants, each consisting of aeration tank and settling tank with air lift sludge return, were fed trickling filter effluent at a constant rate (300 mL/min).

Hydraulic detention times in the aeration units were 0.4, 1.7, 4.0 and 9.2 hrs. Temperature was maintained at 25°C. Effects of pH control, sludge wasting, and detention time were evaluated. Results indicated that activated sludge treatment substantially increased overall BOD, COD, organic carbon, and MBAS removals. At detention times of at least 1 hr significant nitrification was achieved. Control of pH with NaHCO_3 improved nitrification efficiency; however, substantial nitrification was achieved at pH levels below 7. Control of wasting and of return sludge was necessary for optimum BOD, COD, and organic carbon removals and for optimum nitrification.